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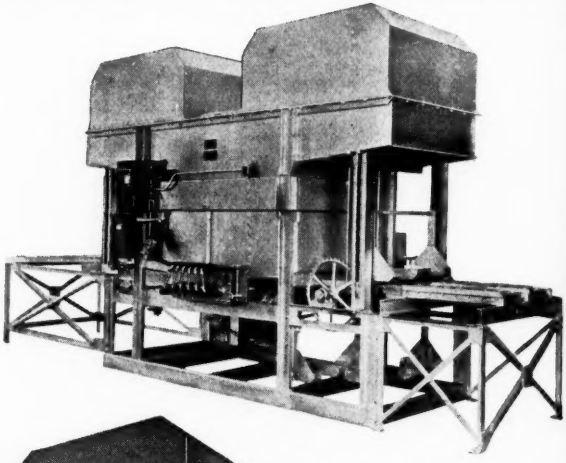

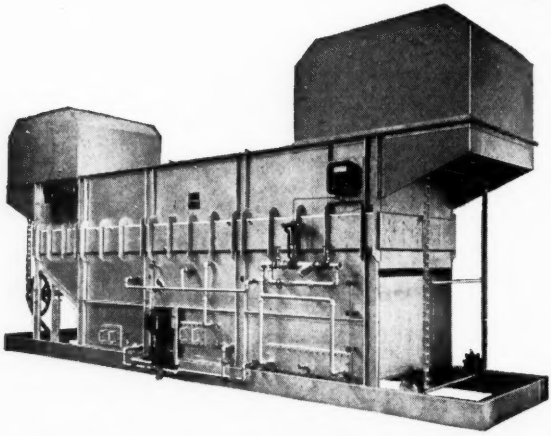

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CINCINNATI, OHIO VOL. 1, No. 8

MAY, 1937

Modern Equipment Facilitates Enameling Operations at Corcoran-Brown Plant

BY CHARLES VORDENBERGE

Foreman of Finishing Dept., Corcoran Brown Lamp Co.

THE modern automobile has virtually reached a state of perfection, mechanically; thus the most important factor in the merchandising of the automobile today is appearance. The term "appearance" covers both the quality and color of the finish and also the design, the latter being changed periodically for merchandising reasons. As one of our best known automotive research engineers has said, "The principal reason for changes in automotive design is to make the car owner dissatisfied with his present car and thus create a market for new cars."

It is evident that this more or less constant change in design must work

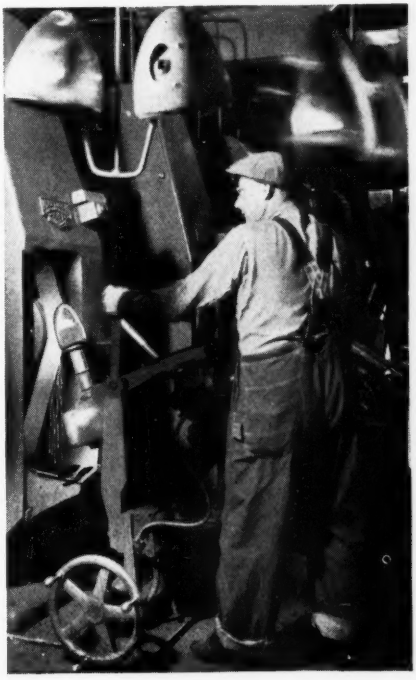


Fig. 1—Each shell is removed individually from the conveyor and placed on a revolving fixture on one of a battery of polishing machines.

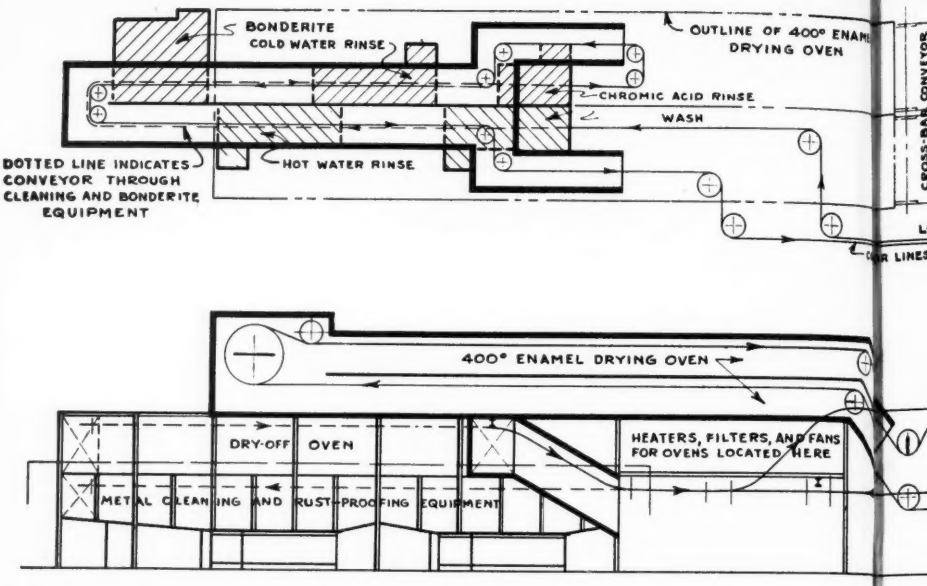
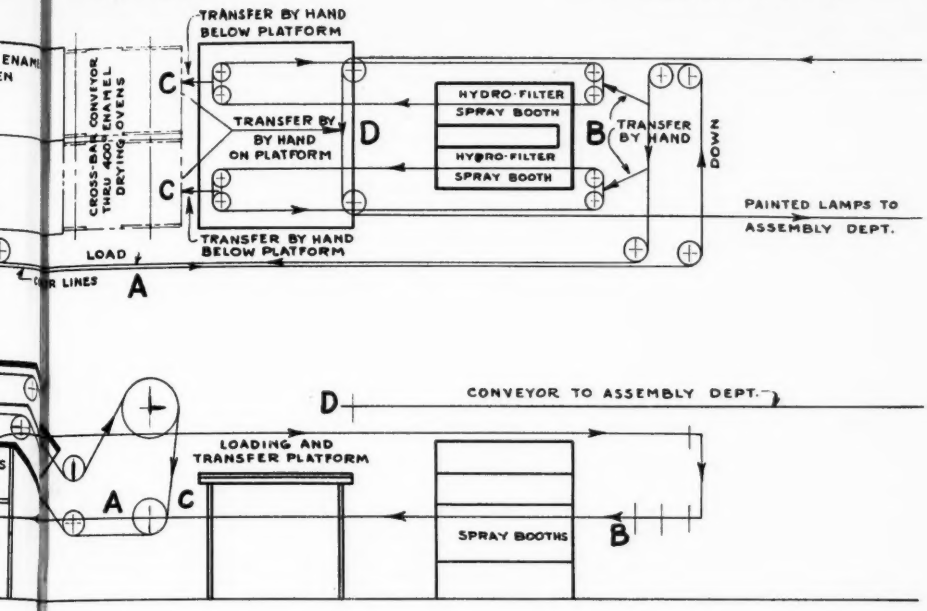


Fig. 2—Illustration showing a complete layout of Mahon enamel finishing equipment. The work processes of cleaning, Bonderizing, and drying. The workpieces are transferred at B to con booths, the workpieces are transferred at C to cross-bar conveyors which carry them through on the platform at D to a conveyor which carries them to the assembly department.

a hardship on the finishing plants and departments and one of the best evidences of a modern plant is the ability of that plant to adapt its equipment — almost overnight — to meet the changing conditions. Such a plant is that of The Corcoran Brown Lamp Co., Cincinnati, Ohio, which manufactures headlamps for a number of the best known automobile manufacturers. Conveying equipment of the latest design, air conditioned finishing departments, and glass enclosed, air conditioned polishing departments have all been installed as needed in accordance with the ceaseless modernization program of this company.

An automobile headlamp consists essentially of four parts: a shell, a reflector, a lens holder, and a glass lens. Steel is used for the shells, reflectors, and lens holders, when these parts are to be given an enamel finish and brass is used when they are to be plated.

Prior to the blanking and forming operation of the headlamp shells, the steel sheets used for this purpose are pickled and then dried. The flat blanks are drawn to form the headlamp shells by means of huge hydraulic presses. After the drawing operation, the shells are placed on a moving conveyor which transfers them to the polishing room. At this point, each shell is removed individually and placed on a revolving fixture on one of a battery of latest type polishing machines, as shown in Fig. 1. The shell is revolved while in contact with the abrasive belt, the



pieces are loaded at A on a single conveyor which carries them through the entire preparatory veyor lines passing through the hydro-filter spray booths. After passing through the spray the final enamel drying oven located above the dry-off oven. The workpieces are transferred again

shaft upon which the shell is placed being geared to a motor mounted beneath the fixture. A thoroughly polished and smooth surface is thus assured. Shells of the largest and smallest sizes are accommodated by the revolving fixture. At the most, four short steps are required for polishing the shell: loading the fixture, moving the fixture toward the machine until it meets the polishing belt, backing the fixture away, and removing the work.

After the steel shells have been polished, they are ready for the first cleaning operation preparatory to finishing. For this operation, they are placed on a conveyor and passed through a closed compartment in which they are sprayed with live steam. Drawing compound, polishing grit, and dirt are removed in this cleaning bath. Fig. 2 shows a complete layout of the enamel finishing equipment and also the direction of the flow of work through the enamel finishing department.

Following the steam spray, the shells are passed through a booth lined with nozzles which give them a hot water rinse. The shells dry during the interval of approximately one minute between the time that they are sprayed with hot water and the Bonderite spray which follows.

The shells are subjected to the spray of the Bonderizing solution at a temperature of approximately 190 deg. F. for a period of two and one half minutes. While on the same moving conveyor, the shells are carried into a cold water spray booth for about a one minute treatment. After this, the shells are ready for

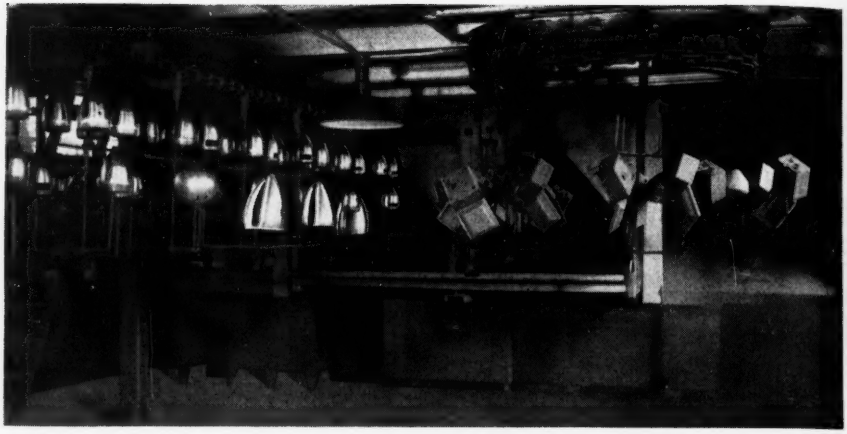


Fig. 3—The conveyor carrying the workpieces can be seen emerging from the chromic acid rinse at the center, and entering the aperture, at the right, of the incline leading to the dry-off oven above.

the chromic acid spray which requires approximately one minute with the temperature of the solution at approximately 180 deg. F. The action of the chromic acid with the Bonderite prepares the Bonderized surface for a primer coating before enameling.

One of the features of the spray cleaning and spray bonderizing operations is the positioning of the spray nozzles along the walls of each spray booth so as to direct the spray not only over the outside of the shell but also on the inside. The spray nozzles in their various positions assure a thorough cleaning and Bonderizing.

A dry-off oven is provided directly over the cleaning and Bonderizing equipment for the purpose of removing all traces of moisture which could possibly have accumulated on the shells as they passed through the chromic acid spray. At the right, in illustration Fig. 3, the conveyor carrying the workpieces can be seen emerging from the chromic acid rinse and entering the aperture of the incline leading to the dry-off oven above. The dry-off oven is of the return type design and is constructed directly above the cleaning and Bonderizing equipment thus conserving the greatest possible space. The shells are carried through the oven on the same conveyor which serves the cleaning and Bonderizing compartments.

The dry-off oven is approximately 56 ft. long, 8 ft. wide, and 5 ft. high. The temperature in this oven is maintained at 250 deg. F., the heated air being supplied by a gas fired, direct type air heater having a capacity of 500,000 B.T.U. Ducts positioned along the sides and the bottom of the oven over its entire length provide a means for cold air intake. The amount of air taken in is regulated by adjustable dampers. The only heat outlet that is provided is located at the inclined end where the workpieces on the conveyor enter and leave.

After the lamp shells are thoroughly dry, they are conveyed to station B, as shown in Fig. 2, where a transfer from the oven conveyor to a monorail spray booth conveyor is made. Suspended from the monorail conveyor are fixtures on which the

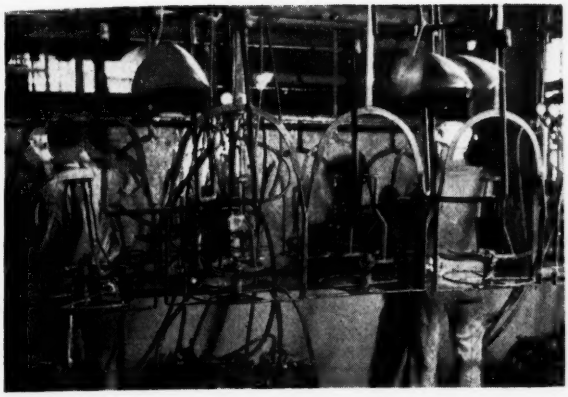


Fig. 4—Excess spray is carried away by the water curtain located at the back of the booth.

lamp shells can be revolved by the spray operator as they pass through the spray booth. Fixtures of this type can be seen in the foreground of illustration Fig. 4. In addition to eliminating practically all handling, the revolving fixture permits the shells to be sprayed on the inside as well as on the outside. Two hydrofilter spray booths located back to back are provided for finishing the shells. A feature of these booths is the method used for removing excess paint and fumes, the method consists primarily of a continuous spray of water at the rear of each booth.

As the shells enter the booth the operator starts them spinning and at the same time begins to spray the enamel. The spray which does not fall on the shell strikes the back of the booth and the stream of water. In this way, the excess spray is carried with the water into a trough at the base of the back panel from which place it can be removed periodically. Besides keeping the back wall free at all times from any sprayed material, the water curtain provides a means of eliminating a greater part of the enamel vapors that might possibly pass into the exhaust system. In illustration Fig. 5, an end of one of the hydrofilter spray booths is shown.

After the enamel coating has been applied, the shells are removed from the fixtures on the monorail conveyor and placed on a cross-bar conveyor of the enamel drying oven. This oven is of the inclined opening type and is divided horizontally into two separate parts, each part being supplied with heated air from a separate heating unit. The shells enter the lower part of the oven, traveling a distance of approximately 65 feet at one level. At the end of that level, the shells are conveyed upward into

Fig. 5—Illustration showing one end of a Mahon hydrofilter spray booth. Workpieces in the foreground are ready for the second application of enamel. The water curtain can be seen at the rear of the booth to the left of the illustration.

the other half of the oven and are returned to the loading station. The temperature of the oven is maintained at 400 deg. by means of a Bristol Pyrotrol which is located 15 ft. from the entrance. The overall dimensions of the oven are 66 ft. long, 17 ft. 4 in. wide, and 7 ft. ½ in. deep. The cross-bars on the conveyor are 7 ft. long and spaced about 30 inches apart. The average speed of the conveyor during normal production is 6 ft. per minute.

Fig. 6—Several workers are removing and inspecting the finishing shells as they come from the drying oven.

The shells which have been given the second coating are removed, carefully inspected and placed on the conveyor to be carried to the assembly department. Illustration Fig. 6 shows several workers removing and inspecting the finished shells as they come from the drying oven.

The interesting setup of equipment described in this article was designed, constructed, and installed by the R. C. Mahon Company, Detroit, Michigan.

The Facts About High Cycle Electric Tools. A complete exposition of the design, construction, and outstanding features of the high cycle portable tools made by The Rotor Air Tool Company, Cleveland, Ohio, is contained in a 12-page booklet that is now being distributed by this firm. The subjects of design, power, speed, weight, power cost, low maintenance cost, and advanced principles of design are discussed in turn, the text being illustrated by the use of a cross section of a Rotor high cycle grinder. Specifications are included. Copy free upon request.

Bulletin No. 6165, issued by Fairbanks, Morse & Co., 900 S. Wabash Ave., Chicago, Ill., describes the F-M line of duplex, self-oiling pumps for handling mud and slush, clear water, petroleum products and other liquids.

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Suggestions for Successful and Economical Polishing

By James J. Manderscheid

Pres. Advance Polishing Wheels, Inc.

PERHAPS one of the most important things in the polishing of metals is the care of the tools and the materials that are used to bring the metals down to a fine finish preparatory to plating. When speaking of tools and materials, reference is made to polishing wheels, buffs, glue, abrasives, compositions, and so on.

The "wild" scratches that appear on the metal that is being polished can be eliminated if the proper precautions are taken such as keeping the different grain sizes of abrasives separated and covered; keeping the glue, both in the barrel and in the pot, separated as much as possible from any abrasives because loose abrasives may get into the glue and be brushed on the wrong wheel; and using a separate glue pot and glue brush for the coarse, medium, and fine grains of abrasives since this precaution will prevent coarse and medium grains from becoming lodged on wheels set up in fine abrasives.

Too heavy a glue mixture will not soak into the fabric of the wheel as well as the proper mixture; too light a glue will not hold coarse abrasives as it should. This is based on the fact that various grains of abrasives are various sizes and the proper consistency of glue is required in order that the glue might wrap itself, so to speak, around the grain and hold it on the wheel. In other words, a heavy glue would tend to cover entirely a fine grain and a light glue would not wrap itself around a coarse grain and hold it. A heavy glue on a fine grain, after it had become dry, would naturally become brittle and in some cases cause more scratches than the grain of abrasive itself. This sometimes is the reason why "wild" scratches appear on the work being polished. Heavy, hard glue chips and breaks off or forms a hard surface on an otherwise soft wheel, in addition to increasing the consumption of glue considerably.

One-half of the thickness of the glue application should be imbedded in the face of the wheel while the other half should be around the grain. This is a healthy condition and makes for long life of the polishing wheel head. It also indicates that the proper mixture of glue and water is being used.

Because glue used in the polishing room is manufactured in different qualities, it is difficult to recommend the amount of water to use in relation to the amount of glue. However, the following proportions are suggested:

90 grain and coarser—2 parts water to 1 part glue.

100 to 150 inclusive—2½ parts water to 1 part glue.

160 to 220 inclusive—3 parts water to 1 part glue.

Glue should be applied to the polishing wheel evenly and should be rubbed in. This does not mean just applying it like paint on a board. The

glue should be worked right into the wheel and the finishing stroke of the glue brush should be with the nap of the wheel so that it is on the wheel evenly and smoothly. Glue that is not rubbed into a wheel sets upon its surface and does not make as good a bond as glue that is rubbed in. Too much glue in one place on the wheel causes a lump of polishing grains to gather in that particular place. The proper mixture of glue and water permits the operator to flow or brush the glue on the face of the wheel evenly and this naturally makes for an even distribution of abrasive on the face of the wheel.

The amount of glue and water should be weighed so that the amounts used are correct. This takes more time than mixing by measure but it eliminates guess-work. If mixing is done by measure then a suitable container which will hold the given amount should be used but when using the measure system flake glue should never be used because this type of glue does not pack like ground glue. It has been proven that two measures of the same size of flake glue will vary in weight as much as 15 per cent. Naturally, this will throw off the mixture of glue and water and after it is melted down the liquid glue will either be too heavy or too thin.

The proper method of soaking glue is as follows: Weigh out the required amount of water and glue and add the glue to the water (not the water to the glue), mixing and stirring it well. Let stand until all the water is absorbed by the glue. Over-night soaking is recommended. After the glue has been soaked over-night it can then be heated, ready for use, the next day. Because of this soaking, the glue will melt down uniformly into liquid in much shorter time than if it had been mixed and heated immediately.

The water in the jacket around the glue pot should be 170 to 180 deg. F., which will give the glue in the pot a temperature of about 150 to 160 deg. F. This temperature is important because glue heated higher than 160 deg. loses some of its adhesiveness and if it is not heated to 150 deg. it does not spread on the face of the wheel and appears heavier in liquid than it would had it been heated to 150 deg. For this purpose, thermostatically controlled, electric glue pots are among the safest kind to use.

If at any time it is found necessary to add water to glue, because of the constant evaporation of water out of the glue pot during the course of the day, a little water can be added but it must be hot. Every precaution should be taken to prevent the chilling of the glue from the time it goes into the pot until the wheel is set up with the polishing grain.

A 2-in. round rubber-set glue brush is recommended because this size is easy to handle and will pick up more glue out of the pot, thus eliminating the too frequent return with a smaller brush to the pot for more glue, as this gives the glue already on the wheel a chance to chill.

Abrasive in the troughs should be kept at a temperature of 80 deg. to 90 deg. F. When wheels are again ready to be set up in abrasive they should be rolled in the abrasive with the nap of the wheel and then pounded. The rolling covers up the glue head quickly, and prevents chilling, and the pounding crowds as much abrasive on the wheel as the glue will hold.

Wheels set up in abrasive should be dried over-night and used the next day. If they are used too soon after setting up, the glue has not had a chance to set and the result is the abrasive will come off before it has served its purpose. If the wheels are dried longer than 36 hours all the water has dried out of the glue and

the glue has become hard and will break and chip off.

The temperature of the room where the wheels are dried should be about 72 deg. and the humidity should be 50 per cent.

When wheels are set up with two heads of abrasive the first head should be allowed to dry at least three hours before the second head is applied. New wheels should be glue-sized. When glue-sizing a wheel take a mixture of glue and water, using seven parts of water to one part of glue, heat up to the proper temperature of 150 deg. and put the wheel that is to be glue-sized on a lathe. Rub this thin glue in, taking the last stroke of the brush with the nap of the wheel. Immediately after, turn the lathe on and allow the wheel to spin. This will throw off the excess glue. Allow the wheel to run this way for one-half to one minute, then take a piece of lump pumice stone and run it over the surface of the wheel lightly to remove high spots and "glue strings". Let the wheel dry at least two hours before setting up in grain.

Glue-size gives a new wheel a base on which the regular coating of glue anchors itself. It is not necessary to glue-size wheels that have been in constant use if the heads have not been worn down to the fabric of the wheel.

Wheels set up in various grains of abrasive should not be set or hung where loose emery from these wheels might drop into glue pots, glue barrel, abrasive troughs or other places where there would be a possibility of getting coarse grains of abrasive mixed with fine grains. This is to guard against "wild" scratches.

A sufficient number of wheels is important as it allows the wheels the correct drying time and permits each man to work steadily without interruption. The lack of wheels cuts efficiency and production in the polishing operation considerably.

Speed is measured by surface feet per minute rather than spindle speeds when determining the speeds at which polishing wheels should be run. It has been proven that a speed of 7500 surface feet per minute is the ideal speed at which to run any and all types of **polishing** wheels in order to get the most out of a head of grain. It is not absolutely necessary to adhere strictly to this speed but it will be found that if the wheels are run at this speed better results can be obtained.

Where large and small diameter wheels are used on one piece of work many shops employ what is known as the "gang system" of polishing and buffing. By this is meant one man uses one size and type of wheel and does probably one or two operations on a piece of work. He then passes it along to the next man who uses a different size and type of wheel, if necessary, and does another operation on that same piece of work. This is continued until the job is completed. Such a system eliminates many changes of wheels on the polishing lathe and allows the man to become accustomed to doing that particular part of the job. In most cases it has been found that this speeds up production and cuts costs considerably.

The nap is a very important part of a polishing wheel. In handling the wheel from beginning to end the nap should be the first consideration. In other words, the wheel should be run with the nap. If it is run against the nap it is like stroking the fur of a cat the wrong way. Glue should be applied to the wheel with the nap; the wheel should be set up in abrasive with the nap and above all it should be run on the lathe with the nap. If the wheel is run against the nap the abrasive is lifted from the face of the wheel, causing short life of the abrasive head. It is suggested that

the wheels be marked for running direction.

All polishing wheels should be balanced, and a balancing ways is recommended. This is an inexpensive tool that is very accurate and easy to use. A wheel should be balanced before it is set up in abrasive. If a wheel is balanced after it is set up with abrasive and is first run on the lathe it will be in balance but after work is applied to the face, the high spots of abrasive will be knocked off. The wheel then becomes out of balance and will remain that way during the entire life of that particular head of abrasive. Many times when a wheel is being set up, a little more emery is put on one part of the wheel than on another. That is unavoidable but if the wheel is balanced before the abrasive is put on, the excess amount will be thrown off as soon as the work touches the abrasive, thus allowing the wheel to run smoothly.

After wheels are properly set up with abrasive, what is termed the breaking up of the abrasive face is suggested. This is done by using a round pipe and hitting the face of the polishing wheel at a 45 deg. angle and then crossing these marks at a 90 deg. angle. This permits the cushion of the wheel to become effective and as the wheel is used this breaking up allows the glue and abrasive to become more flexible and act with the cushion of the polishing wheel.

When a wheel has been cleaned off and is ready for re-setting with abrasive the operator should refrain from touching the face of the wheel. After a wheel is cleaned off, a tool should not be held up against the face of the wheel in order to stop the wheel because there may be grease and dirt on the tool. Also, if grease from hands or gloves touches the face of the polishing wheel it tends to prevent the glue from holding the abrasive since glue does not adhere to a greasy surface.

Glue pots and the place where the glue is applied to the wheels should be kept out of all drafts. A draft will cause quick congealing of the glue, which, while it does not harden, forms a skin over the surface and does not permit the emery to stick on the wheels as it should.

Very fine grains of abrasive, such as flour grain, are hard to "set up" on the face of a wheel. The glue must be thin enough so as not to protrude above the grain and for that reason most polishers, especially those of long experience, prefer to use 200 grain to get a flour grain finish. To accomplish this with 200 grain it is necessary to "stone down" the 200 grain so that it does not have or leave the 200 scratch on the work. This is done by holding a hard, smooth stone against the face of the wheel, and thus break down the abrasive to a smooth surface. Apply polishing grease to the wheel and work it in with a piece of metal. After a few pieces have been run, the wheel usually produces a fine, uniform finish, resulting in a highly polished surface. Such a polishing operation is generally done with a felt wheel or some other polishing wheel of equal texture.

A piece of metal, preparatory to plating, must be highly polished and chemically clean. On the last polishing operation—that is, the one before the work is plated—a lubricant is usually used and some polishers use emery cake while others prefer grease stick or polishing grease. When the polished metal is to be plated it must be cleaned in an alkaline solution to free it from any grease or oil that has adhered to it during the greasing out operation. Where a grease stick is to be used, manufacturers of buffing composition and polishing greases recommend the use of a grease stick that is highly saponifiable so that it

will clean or wash from the work without scrubbing with a tampico brush, pumice and water.

It is the consensus of opinion that the wheels, buffs and compositions are the tools that must do the work when polishing and buffing and the operator should be the guide. In many cases the operator by hard labor does the work that the wheels should do because he does not handle the work correctly or because he is not using polishing wheels of the proper density.

It is a well-known fact that good polishing is the foundation of good plating. When corrosion and rust attack a plated metal it is because elements go through the pores of the plate and attack the base metal. If the base metal is properly polished, naturally the pores of the metal are closed, and thus any possibility of such an attack is reduced to a minimum.

In many cases where good polishing is done, plating time can be reduced. A great deal of nickel buffing on poorly polished metals is done to flow the nickel over the poorly polished surface in an attempt to cover it up. Where the metal is given a good polishing job the amount of nickel buffing is considerably reduced. It also follows that in this case it would not cut off a lot of nickel.

Whenever a metal is heat treated, or for that matter whenever a metal has a scale on it, pickling the scale off before polishing is recommended. If this scale is removed by pickling it unquestionably reduces the polishing operations, thereby saving materials and time in polishing.

Shepard Niles Anti-Friction Bearing Hoists Bulletin 126. This bulletin now being issued by Shepard Niles Crane & Hoist Corporation, Schuyler Ave., Montour Falls, N. Y., illustrates and briefly describes the design and construction principles of Shepard Niles electric hoists. More particularly it points out the advantages of the anti-friction bearing "LiftAbout"—a hoist in which all of the leading features of modern design are incorporated.

Illustrations show the LiftAbout in operation in various kinds and types of plants and particularly illustrates the adaptability of the LiftAbout hoist to low headroom conditions, for use in places where dust, dampness and fumes are a factor, and so on. Principles of design are completely revealed through the use of drawings and "cutaway" halftones. Copy free upon request.

Buffalo Unit Heaters Bulletin No. 3050. This attractive 30-page bulletin describing and illustrating Buffalo Unit Heaters has been brought out by the Buffalo Forge Company, 190 Mortimer St., Buffalo, N. Y. Included in the bulletin are B. t. u. capacity rating tables, dimension tables, a B. t. u. rating for various steam pressures and entering temperatures table, and also a table for unit heater ratings for external resistance. The Buffalo "Highboy" and "Lowboy" heaters are described in detail. These heaters are said to meet the requirements of all types of buildings, but principally the building with large floor area. Unusually good efficiencies are said to be obtained, due to the design of centrifugal multi-rotors supported on ball bearings, the shape of the individual fan housings, the use of Aerofin heating coils, and the correctly shaped and proportioned outlets which diffuse the heated air effectively through the working area. The standard construction is interchangeable, thus providing a universal unit—floor or suspended type in either upright, horizontal, or inverted position. A copy of Bulletin No. 3050 will be sent upon request.

Modern Cornell Doors Upward Acting. Cornell Iron Works, Inc., 36th Ave. and 13th St., Long Island City, N. Y., has just published a twelve page general catalog under the above title. Cornell has been making upward acting doors and grilles since 1828. The catalog describes and illustrates with details and photographs the Cornell Upward Acting Doors and Grilles. Illustrated are rolling doors and rolling grilles in various metals, and wood and steel Float-Over, Canopy, Bifold, Vertical Lift and Turn Over Doors. Actual installations are featured and unusual applications are shown. A copy is free for the asking.

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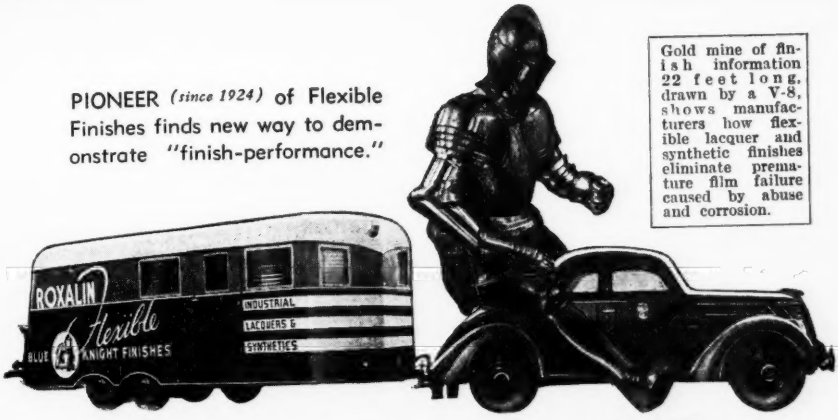

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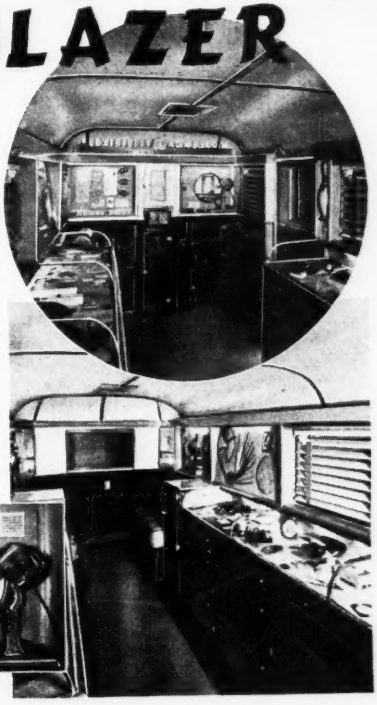

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Aluminum Finishing Procedure, Part I

This Article is the first of a series dealing with the fundamental operations in the finishing of Aluminum.

By Robert T. Griebling

Aluminum Company of America

THE primary purpose in giving a surface finish to a metal article is to enhance its appearance. There is nothing particularly attractive about a slab of steel as it comes from the rolling mill, or about a dirty brown copper ingot waiting to be transformed into an object of gleaming beauty. A zinc casting, just out of the mold, looks as though it had been lying on a dump for years, and a parcel of aluminum gray plate is a lifeless and sorry thing at best.

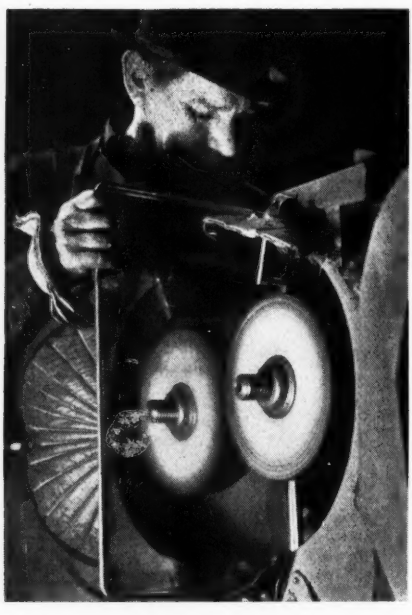

Fig. 1—Buffing a service tray. Note high gloss already apparent.

But just apply an abrasive and see what happens! Touch a polishing wheel to these metals and watch them come to life! Give them a chemical dip and note how they brighten! Sales possibilities are increased a hundredfold by a few deft face lifting operations on the surfaces of metals.

Discussion on the finishes of aluminum can fall into three general groups, the first to concern itself with mechanical finishes, the second with the Alumilite process, and the third with those finishes which increase aluminum's resistance to abrasion.

Mechanical finishes have little or no protective value; they serve only to make the metal more attractive or to act as a foundation for protective or decorative treatments. Success in their application depends on the alloy of the object to be finished, its shape, and the skill of the operator. As a result, the most efficient system of finishing individual products must be worked out in each case. The discussion which follows represents actual plant practice on an article of given

composition and design, but the procedure may have to be somewhat modified in finishing similar products under different plant conditions.

Polishing

Polishing is divided into four general operations. The trade has given them various names. In the aluminum industry they are designated as roughing (coarse grinding operation employed as a preliminary step), oiling (a refinement of the roughing procedure in which a lubricant is always used), buffing (operation used to bring out the high lustre of the metal), and coloring (the final operation in the polishing procedure, giving the work the highest possible lustre and gloss).

The result of polishing is a smooth, brilliant finish. Gross inequalities and deep scratches, which may have been left after fabrication, have been removed, providing the metal with an even, pleasant surface. Polishing equipment, both manual and automatic, is of the same general type for aluminum as that used for other metals, but composition and construction of polishing wheels, and their speed, are the variables that must be carefully controlled.

Polishing wheels for aluminum are generally softer than those used on other metals, the abrasive is finer, and the wheel speeds are reduced to maintain the cutting efficiency of the abrasive and to prevent overheating.

Roughing

The first step in the polishing of aluminum is the roughing operation, although die castings or fabricated articles seldom require it. Sand castings always receive this treatment, which consists in obliterating deeply scratched surfaces and unevennesses by means of a wheel made of pieces of muslin or canvas glued or cemented together. Wheels made of wood, faced with leather, sheepskin, felt, or flannel can also be used. Flexibility of the wheel, important in the polishing of curved surfaces, is influenced by the weight and grade of the material and the manner in which it is joined.

Once the material is decided upon, the wheel is coated with a layer of glue in which an abrasive is imbedded. Cements, in addition to glue, are also used by certain manufacturers. Emery graded from No. 60 to No. 100 is satisfactory, as is fused aluminum oxide. Application of glue and abrasive to the wheel must be properly controlled if difficulties are to be avoided. Extensive information on this subject may be had by applying to suppliers of abrasive grain, whose most recent recommendations should be followed.

Fig. 2—Applying a satin finish to the underside of a tray of Kensington ware. This is the next to the last polishing operation on this piece.

Wheel diameters in the roughing operation are allowed a wide range—from 6 to 29 in.—but width is lim-

ited. Depending on the area of work to be finished, the width varies from 1½ to 3 in. The wheel speed should give a peripheral rate of about 6,000

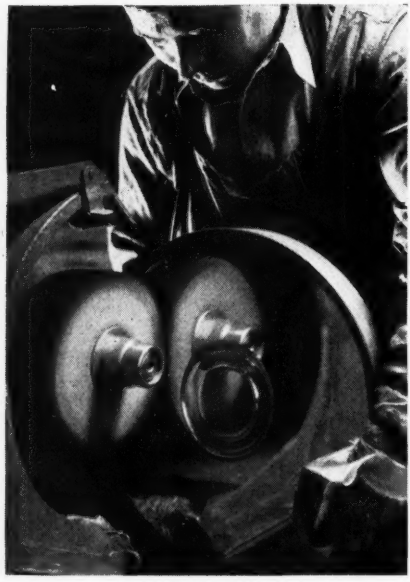

Fig. 3—Coloring the upper side of the tray. The lustre appearing on the piece is as high as it can be obtained by mechanical means.

ft. per min. Higher speeds cause excessive heating, tending to break down the glue, while slower speeds cause the abrasive to be torn out of the glue. If the heat is too great at 6,000 ft. per min., it may to some extent be reduced by the application of a lubricant such as tallow, or a mixture of tallow and polishing oil. The lubricant should not be driven into the pores of a casting, for then it will spot the surface with seepage in a later finishing operation.

Portable rotary vertical air grinders, set up with cup grinding wheels or flexible carborundum paper disks and developing 5,400 r.p.m., are used in breaking down the "as cast" surfaces of large castings which cannot be held against an ordinary polishing wheel.

Lubricants are not generally used in the first polishing operation, but, if applied with care, buffing tallow or oil is sometimes employed. Excess oil and grease can be removed from a casting by both oxidation and vaporization. This is accomplished by keeping the casting at a temperature of 400 to 600 deg. F. for half an hour.

Sand holes and porosity on the surface of a casting present no particular finishing problems, for they may be satisfactorily welded and then finished with a cup wheel or a disk sander.

Oiling

A refinement of the roughing procedure is known as oiling, principally because a lubricant is always used on the wheel. Fabricated articles, such as sheet and tubing, require it as a preliminary operation. Sand castings invariably require it, and die castings are always oiled as the first polishing operation. The wheel is made of felt or sheepskin, and the grade of emery varies from No. 100 to 220—finer than the emery required for roughing. The wheel is also softer.

Felt wheels are used because they have uniform density and contain no sewed or cemented seams. Wheel speeds and dimensions are much the same as those used in roughing, and the lubricant may be tallow, oil, beeswax, or tallow compositions. They must be used because they reduce the danger of burning the felt. An extra fine polish may be obtained by using a wheel faced with No. 100 emery and then following this treatment with a second wheel faced with No. 220 emery.

Buffing

When a high lustre on aluminum is desired, oiling is followed by buf-

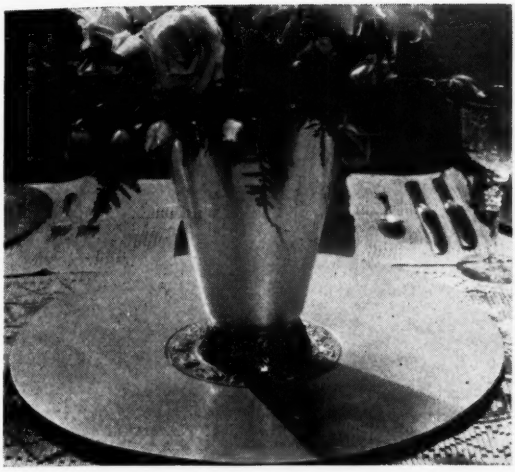

Fig. 4—The finished piece in a dining ensemble. A cast brass ring has been added for decoration. The vase on the tray is also of Kensington ware. It has a brass foot.

fing, which differs from other polishing operations in that the abrasive is applied in a grease binder instead of being glued to the face of the wheel. Preliminary tests must be made in order to find the most suitable abrasive for the work.

Chemically high in silica, the most commonly used buffing agent is tripoli powder, whose value lies chiefly in its physical structure. Its grains, soft and spongy, are free from crystalline cutting edges, and they crush down in buffing to present fresh polishing surfaces. The coarser grain structures cut more rapidly and the finer ones give a brighter finish.

The powder is molded into a cake by mixture with grease, whose base may be various grades of tallow, beeswax, stearic acid, petrolatum, or paraffin, and the selection of the binder must be made to include the various factors that affect buffing. In general, the grease should be sufficiently tough to stand handling, while its melting point should be low enough so that the proper amount of abrasive may be transferred to the wheel. The binder should adhere to the wheel and yet have good lubricating qualities, and it must be easily removed in cleaning. It dare not, of course, mark the work.

The abrasive cake is pushed against the wheel as it revolves, and the heat generated softens the binder to such an extent that the abrasive becomes attached to the wheel. During buffing, this procedure must be repeated frequently to preserve the cutting action.

A number of muslin disks compose the buffing wheel, whose hardness is affected by the quality of the cloth, the number of disks, and the manner in which they are sewed together. The wheels are run at higher speed than in the earlier finishing operations. This is necessary in order to

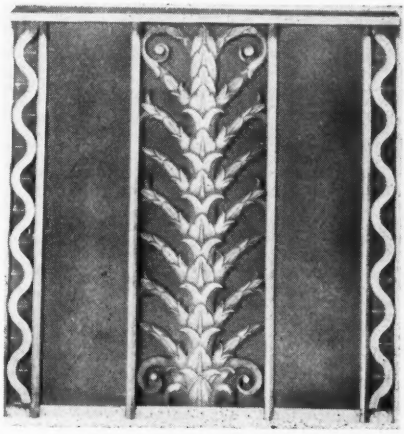

Fig. 5—A typical cast spandrel made of aluminum. Note how this piece has been sandblasted and highlighted.

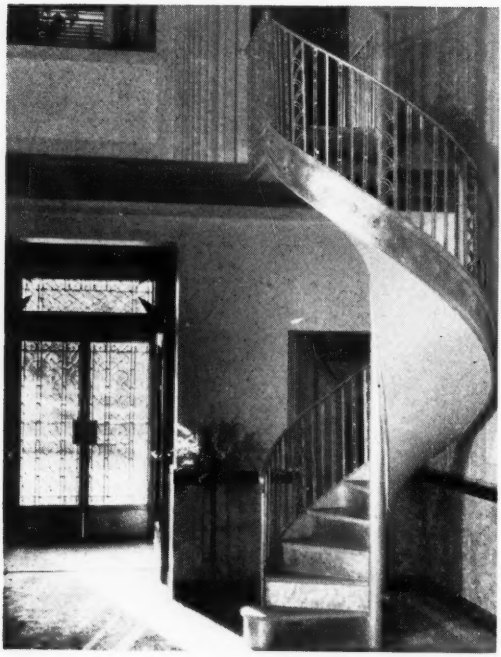

Fig. 6—An exceptionally attractive illustration of hand-wrought aluminum. This circular staircase in the Merchants Bank, Cleveland, Tennessee, was produced by the Forges of Kerrigan, a Nashville, Tennessee, concern.

hold the edges of the buffing wheel, impregnated with the abrasive, close to the work. Buffing wheels should have a peripheral speed of 7,000 to 7,500 ft. per min. There is no danger of overheating because the finer abrasives generate less friction than the coarser ones used in roughing and oiling.

Coloring

Coloring is the final operation in the polishing procedure. By it is produced the highest possible lustre and gloss on aluminum. The article to be colored is first cleaned in benzine and then dried. The wheel is an open wheel, of the same size as a buffing wheel, made of unsewed muslin or flannel disks, which may even have spacers in them to make the wheel softer. The peripheral speed is 7,500 to 8,000 ft. per min., and the abrasive is a soft silica mixed with a grease base.

Other Mechanical Finishes

The four operations of roughing, oiling, buffing, and coloring, combined with the variants obtainable through alloying and heat treatment, provide many of the interesting finishes on aluminum. However, the selection of mechanical finishes is not limited to these alone.

Sandblasting, for instance, is a rapid and inexpensive method for finishing aluminum, giving a uniformly matte surface. Many sandblasted surfaces may be protected by a lacquer or clear varnish coating, which can be easily washed. An Alumilite finish, a detailed description of which is given in the second article of this series, is still another.

Washed silica sand is probably the most commonly used abrasive for sandblasting, although in some casts steel shot, pulverized silicon, carborundum sand, or other materials may be employed. The first two impart a light gray color to aluminum; pulverized silicon produces a bluish cast, carborundum sand a dark gray.

Air pressures of approximately 30 to 90 lb. per sq. in. are employed depending on the size and shape of the piece. A very fine sandblast is sometimes desirable for certain work. In such cases, the blasting material is 200 mesh or finer, the nozzle is ½ in. by 3 in., and the nozzle-to-work distance is 8 to 12 in.

The equipment for sandblasting aluminum consists, as it does with

other metals, of a sandblast chamber, an exhaust system, and a hose for the blast. The workman should be protected against dust by suitable clothing and headgear.

Scratch-Brush and Satin Finishes

When a rotating wire brush is applied to an aluminum surface, a lined finish is obtained, whose fineness is regulated by the size of the wires of the brush. This is called a scratch-brush finish. The wheels are 10 in. in diameter and carry wires from .005 in. to .015 in. in diameter. The wire material may be brass, stainless steel, nickel, or German silver. The wheel should revolve at about 2,000 r.p.m.

Air-slacked lime is used to remove dirt and grease from the metal. Then the article is held lightly against the edge of the revolving brush until the desired roughening is attained. The scratch-brush finish is applied to castings preferably after a fine sandblast, but if the surface is exceptionally rough, medium sand is used. The wheel speeds for castings are low 450 to 600 r.p.m. because higher speeds tear the metal surface excessively, with the result that there is a lack of uniformity in the final finish. The wheels must be cleaned frequently, for they gradually accumulate oxide and metallic aluminum particles.

A modification of the scratch-brush finish, obtained by treatment of the metal with a finer wire brush wheel or by abrasives, is the satin finish. This imparts a soft, smooth sheen with lower reflectivity than a highly polished surface, caused by the tiny parallel lines scratched on the metal by the brush wires. Various effects may be obtained by changing the angle of contact between brush and aluminum surface.

Some surfaces can be satin-finished without the use of a wire brush. A cylindrical object, like a sauce pan, may be rotated in a chuck while an oily abrasive cloth is held firmly against the revolving surface. A further rubbing with steel wool dipped in oil and emery powder, and a final cleaning with a rag while the article is still revolving, will result in a bright, silvery finish.

Satin finishes can be produced on castings, but the surfaces must first be polished as described in the next two paragraphs. A very fine satin finish may be obtained by the use of a rotary fiber brush, or by manual rubbing with a paste made of pumice and oil. Belt sanders can also be used in satin finishing when surface conditions permit. They should operate with a speed of 2,400 to 3,000 ft. per min., and should be made of emery graded from No. 80 to No. 240.

The Highlighted Finish

The combination of sandblasting and buffing produces very attractive

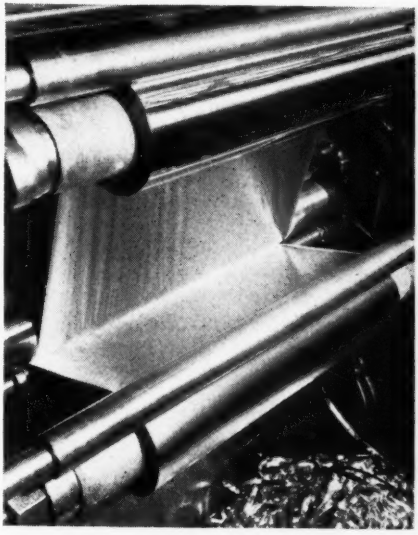

Fig. 7—High polishes are produced on aluminum foil by means of highly polished steel rolls.

effects on aluminum, particularly on castings, on which this method is extensively employed. When depressed areas are sandblasted and raised areas buffed, the result is known as "highlighting." The raised areas are protected during sandblasting, and the background is in turn protected while the highlights are being buffed. The technique has been worked out in considerable detail for architectural applications, and the work is generally done by means of rotating abrasive wheels for irregular castings, and by a belt sander for flat articles.

Sewed muslin buffs, 6 to 12 in. in diameter, are used. They are glued together to give the required thickness and faced with No. 60 to No. 120 emery. Each new wheel is first broken down with a file to reduce the heavy cutting action of fresh emery. Wheels with No. 120 emery are used with buffing tallow, while wheels with No. 180 are commonly employed with a greaseless polishing medium. These produce very satisfactory polishes, but if higher lustres are desired, the surfaces may be buffed with a muslin or a felt wheel and a polishing compound, such as tripoli. Coloring brings the polish to a still higher lustre.

Up to the present the discussion has been confined to those mechanical operations which produce finishes by a certain amount of abrasion. Other methods brighten the face of the metal without removing any of it.

Burnishing, the first of these, gives a bright, fairly smooth surface by the action of steel shot rubbing against the parts to be finished. The pressure of the shot flattens and spreads the projecting points or particles of metal on the surface of the parts. It is often used to produce a finish where low selling price forbids the employment of hand labor. It is inexpensive because it allows, according to the size of the article, hundreds of separate pieces to be finished at the same time.

Burnishing is accomplished by tumbling the work, together with steel shot, in a wood-lined barrel, with slightly alkaline soap and water acting as a lubricant. Small balls are more effective, but more easily lost, while heavy shot has a tendency to damage small articles. A satisfactory size, for general work, is the 5/32-in. steel ball, although numerous other shapes, such as cones, pins, slugs, "pebs," and disks may be used for special purposes. The balls need not be perfectly round, but to burnish well, they must be as hard and as smooth as it is possible to make them. The ratio of shot to parts should be about two to one by volume.

Barrels should be made of hard wood. Lead should not be allowed in the barrel as it tends to coat the shot. This coating is transferred to the pieces, giving them a dull, leaden appearance. If the shot becomes coated with aluminum dust, thus reducing its burnishing efficiency, the dust may be removed by means of a caustic dip.

Hand-hammered aluminum looks something like hand-wrought silver or pewter, and finds its best applications in novelties and giftware. A common method of hand-hammering consists of heating the material in a smoky coal fire and then performing forging operations while the work is covered with a fine layer of soot. Part of the black deposit is hammered into the surface, making the finished piece reminiscent of the forge. Raised portions can be highlighted by going over them with sandpaper or emery cloth.

Fluting consists of rolling parallel lines into the surface of the sheet. This makes an inexpensive and attractive surface for some purposes, but it can only be applied at the mill.

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Barrel Burnishing of Metal Products

Fourth Article of Series — The use of Soap in the Barrel Burnishing Process

By H. Leroy Beaver

WHILE this paper is primarily a discussion of the application of soap in the barrel burnishing process, we must, of necessity, provide it with its proper beginning and that is to discuss the character of water available.

There is a very wide variation in the hardness of water as found in various localities. Water drawn from driven wells is invariably hard — rain water is invariably soft — and surface water depending on the locality ranges from zero to as much as 89 grains hard. The degree of hardness of water is always expressed in grains per U. S. Gallon or parts per million. Averages of grain hardness, we are told, ordinarily will range from 5 to 9 in the east and from 10 to 15 in the mid-west, while the far-west has even a wider range. Then too, in many localities excess amounts of various chemical matter are found. The point to be considered is that of reducing hard water as found in your locality to such a low degree in grains that it will best function when used with average market soap, in carrying out the burnishing process.

If your plant is located in a city or town having public utility water service, the grains in hardness of your water supply can be immediately determined by inquiry to the chemist of your water supplier. If, however, you are located in an isolated section or you use your own well, spring or stream as a source of supply, a simple but accurate method of determining the hardness of your water supply is to follow through this formula of procedure:

Take a 4 oz. oil sample bottle and in it place 50 c.c. of water, marking the high point of this water on the bottle.

Now using a dropper bottle filled with standard soap solution (this may be obtained from any soap house or water softening material supplier), you add nine drops of the standard soap solution to the 50 c.c. of water in the bottle. Now shake this vigorously. If a one inch head of suds forms which remains stable for one minute, the water will be considered as zero hard, or soft water.

If suds do not form, then add standard soap solution in increments of 15 drops, shaking after each addition, until a one inch stable suds is formed that remains for one minute. The total number of drops of standard soap solution added to the 50 c.c. of water when divided by 30 equals the hardness of the water expressed as grains per U. S. Gallon.

Having determined the grain hardness, to eliminate it as far as possible without chemical or mechanical softeners, add one ounce of tri sodium phosphate per grain of hardness per 100 gallons of water used.

In all applications in burnishing where soap is used we start with the assumption that the water to be used is what we would normally designate as soft or else hard water that has been normalized or softened either by chemical or mechanical processes. Very often these mechanical processes, a notable example of which would be the Permutit System, give splendid results and if your water supply is more than ordinarily hard or has an unusual excess of one kind or another of chemical matter, investigation of such mechanical processes is well warranted.

In discussing the various types of soap used in barrel burnishing we may go back thirty years to the time when it was thought that a quantity of cocoa butter added to hot water in the barrel and then adding caustic soda, produced the ultimate in results, but this merely involved the saponification of the cocoa butter into a soap by the addition of the caustic soda. Another soap at one time in wide use was composed of linseed or flaxseed oil saponified by the addition of potassium hydroxide. This was popularly known as "fig soap" being a semi-transparent brown mass filled with tiny air bubbles resembling seeds of figs. Both of these have long since been discontinued for practical barrel burnishing work. There were many other methods for utilizing various fats and oils down through the years, which, while they would be interesting in a narrative way, are really now not important in the light of present day practice.

Of our present day soaps for burnishing, we have the following:

Silicate Soaps are generally used where powerful detergent properties are required. The addition of silicate of soda enables a soap to hold large proportions of water and yet present a fine consistency. Generally the silicate in the form of a concentrated solution is crutched or stirred into the soap in a mechanical mixing machine after the completion of the saponification and it appears to enter into a distinct chemical combination with the soap. While soap of this type is largely used, we do not recommend it for barrel burnishing application.

Glycerine Soap ordinarily consists of about equal parts of fine hard soap and glycerine. The soap is melted by heat and the glycerine stirred in. By using an excess of glycerine a fluid soap is formed. The soap is soluble in glycerine, and such a soap has feeble lathering qualities and is at times difficult to rinse. Soap containing a small proportion of glycerine forms a very tenacious lather, and when suds of long duration are desired, glycerine is added to the soap formula. Soaps of this type are also used to some extent in barrel burnishing, but we do not recommend them.

White or Amber Soap from which burnishing soap chips, flakes or powder are generally made, are soaps made lighter than water, the general practice being to take milling soap neutralized with sodium bicarbonate or a mixture of fatty acids and aerating by mixing the hot soap with air in a specially designed crutcher. They generally produce a good lather, and good lubrication in the mass. Sometimes this lather is made more tenacious by the addition of gum tragicanth. This is the type of soap most widely used in bar-

rel burnishing, and it generally produces good results when properly used.

Curd Soap is chiefly a stearate of sodium. It is formed chiefly by boiling fat or oil with alkali and then removing the unused lye. The fat or oils differ according to various manufacturers and the commercial names applied to curd soaps are many and varied. Some makers use tallow, some olive, palm, corn or other oils and again other makers use tallow in combination with these oils. In any event a mixture of several oils enters into the manufacture of curd soaps and in varying proportions. Lye is generally the alkali used for saponification. These soaps are "salted out" or "grained", a process whereby the soap is separated from the spent alkalis. Soap of this type is by far the most desirable for barrel burnishing for the reason that by the addition of a "defoamer" the lubricating quality of the soap is carried in the water in the barrel, and while curd soap generally produces a satisfactory lather, it is not tenacious and it rinses easily and without water breaks. This is representative of the type of burnishing soap used by the majority of the larger hotels, restaurants, hospitals, and so on, for barrel burnishing their table silverware. It is by far the most satisfactory of all the soaps used for barrel burnishing.

Quite recently a new product has appeared on the market that may have an application in barrel burnishing. It is variously known as Orvus, Dupinol, and Gardinol. Designated as a "Soapless Soap" it produces a good lather in either hard or soft water. It is made by adding hydrogen to already known vegetable oils—a process similar to the production of gasoline and allied products through the hydrogenation of coal, except that here fatty alcohols are the end product of "catalytic hydrogenation". These are changed into "Soapless Soap" by treatment with sulfuric acid. We have not thus far conducted enough trial runs on the product to enable us to say whether it will function satisfactorily in barrel burnishing. We merely mention it as indicative of the advancing trend in soap production.

Many platers have asked us about the pH of soap, and for their information we would say that of seventeen makes of soap that we have tested for barrel burnishing work and where the titre ranged from 19 to 42, the average pH of these soaps was 10.2.

Among many operators the opinion seems to prevail that soap, as used in a burnishing barrel, must have powerful detergent properties whereas the opposite is the case. The first and indeed the sole function of soap in the barrel burnishing process is not as a cleaner or detergent but as a lubricant to act between the metallic burnishing materials and the parts to be burnished. We would like, if possible, to eliminate the mistaken belief once rather widespread that a proper barrel burnishing soap must of necessity have powerful detergent properties.

If the reader would analyze the subject as the writer has done he would find that in almost every case chip or flake soap or soap powder sold for barrel burnishing purposes has been formulated solely for household applications such as the laundering of clothes, washing of dishes, and so on. It cannot be said that soaps so intended are the best for barrel burnishing work. These soaps are invariably designed for use in soft water with a few exceptions of soaps designed especially for use in hard

water, but we do not use soaps in barrel finishing in the same sense as we use them in household or laundry work.

We find an altogether different form of procedure when soap salesmen call on the laundry trade and the same salesmen when they call on the metal finishing trades. Laundrymen will tell you that invariably the first question asked of them is, "What about your water supply?" We have never, even though we have diligently inquired, found a single operator in the metal finishing trades who has ever been interrogated in this regard. If the water condition is not volunteered by the buyer, soap salesmen generally elect to presume that irrespective of the kind and character of soap offered, that it will function satisfactorily for barrel burnishing. There is a vast difference in the functioning of soap intended for use in normal water when it is sought to be used in hard water. If hard water is not properly softened or normalized the probabilities are that an ordinary "market" soap will dissolve too slowly or only partially and a scum or residue will be formed on the surface of both the burnishing material and the parts being burnished that will be difficult to remove and that may and probably will seriously interfere with proper complete rinsing on completion of the burnishing operation and subsequent operations on the parts. This was one of the thoughts we had in mind when we discussed "dirty", "dull" or "lustreless" burnishing materials in the paper on that subject which appeared in the April issue of Products Finishing.

Many of the troubles we have been called upon to correct have been immediately solved by checking through on the water supply, and then after normalizing the water, the recommendation of a practical and satisfactory barrel burnishing soap for the various operations.

There has always been more or less misunderstanding, or perhaps we should say, lack of understanding as to just what is meant by the word "titre" when applied to a soap. To thousands of barrel operators the word titre when so applied means nothing more than just another unimportant word with no particular significance. The writer in an effort to clarify this, asked a prominent soap chemist for a short and simple definition of the word and he tells us:

> "The titre of a soap is that temperature expressed in degrees Centigrade at which the fatty acids from which soap is made crystalize or solidify".

A technical description of the process for determination of the titre of a given soap is quite involved and just a bit too much for we laymen to quickly assimilate, and is consequently omitted from this text.

The titre of the soap you use however is important because when the titre in degrees Centigrade is converted into degrees Fahrenheit it pretty closely indicates the temperature of the water in which the soap will best function when used for barrel burnishing and also indicating the temperature of the water to afford complete rinsing after the burnishing operation has been completed. For example, if a soap has a titre of 40 degrees Centigrade, this figure when converted would indicate 104 degrees Fahrenheit. Now in order to secure the most rapid formation of a burnishing soap solution in the barrel it will be seen that with a 40 titre soap the water should be at least 104 degrees Fahrenheit or slightly higher for most rapid dissolution of the flake, chip, powder or curd soap used. It will also be observed that when parts are unloaded from the barrel they are covered with suds. If water lower in temperature than the titre designates

is used, the fatty content of the soap contained in the suds will, at least to some extent solidify on the surface of the burnished parts and will be difficult to rinse free of water breaks and may become apparent later as evidenced by poor adherence of the later electro-deposited metal coating, or enamel or lacquer, or a condition very similar to where a soap intended for use in soft water is used in hard water and leaves a scum or deposit on the surface.

Our next phase of the subject relates to the quantity of soap required to properly lubricate a given quantity of water so that it will contain sufficient lubricating properties to function properly in the barrel burnishing operation. Both soap and water vary so greatly, that it would be the part of folly and largely misleading to even try to undertake to lay down any fixed rule. Here we find another of those unexplained theories that have crept in and as advocated by both barrel and soap manufacturers. For some reason most of them simply say "Add water to the depth of anywhere from 1 to 4 inches over the surface of the mass, but never designating whether the **burnishing material mass** alone or the **combined mass of burnishing material and parts** is intended. Add either two or four ounces of soap chips and proceed to burnish. The whole procedure surely does not make sense, for no reason has ever been shown why either two ounces or four ounces of soap is the proper quantity. This is only another case where the try and try again method must be adopted. If too little soap is used sufficient lubrication will not be had and the parts will appear dull and lifeless — if too much soap, the parts will be sticky and hard to rinse — so midway of these two conditions lies the answer to the question of each individual barrel operator as to the proper quantity of soap he should use to a given barrel size, or in proportion to the quantity of water in the barrel.

Generally speaking the soaps offered by various manufacturers range from 80 per cent to 99 44/100 per cent pure soap. Many soaps contain fillers which are inert or inactive ingredients and very often it will be found that a cheap flake soap may actually be more expensive to use than a more expensive one. In some heavily filled soaps the inactive, inert or insoluble ingredients may crystalize or deposit in sharp angles and grooves and can be seen as a hard white deposit difficult to remove and in many cases necessitating an additional cleaning operation prior to further finishing work.

Some soaps are made, by the addition of cocoanut oil, to produce a very profuse and really excessive quantity of lather or suds. This lather really means very little in barrel burnishing and the mere fact that you secure a profuse suds does not necessarily indicate that you are getting the proper amount of lubrication in your burnishing operation. Very few barrels are operated completely full and invariably there is more or less waste space in any barrel when in operation. This waste space will fill up with lather or suds, but by no stretch of the imagination can we be made to believe that the parts to be burnished will leap from the burnishing mass into the suds, take on lubrication and then drop back again into the burnishing mass.

Barrel burnishing simply does not function in that manner. Where the lubrication is required is within the burnishing mass itself, hence the fatty proportion of the soap that provides the lubrication should be held as far as possible within the burnishing mass. This can be accomplished with a soap containing in its formula what is known as a suds

"defoamer". On this question of lubrication and lather or suds might we draw a comparison with soluble cutting oils as used on automatic screw and other machines. Would anyone dare say that simply because an emulsion of water and soluble cutting oil does not produce a profuse lather, that it does not function as a lubricant between the tool and the work? We think not. Yet the lather and suds have no more relation in barrel burnishing than they would have if applied to a cutting oil emulsion. Very soon we expect to commence our experimental work on the applicability of these soluble oil emulsions for barrel burnishing work, and we hope to have more to report on this phase of the subject at a later date.

When we speak of suds or lather we do not have reference to a huge piling up of air bubbles of soap solution. Such a suds has really so little lubricating value as to be almost negligible and perhaps we can best explain what we have in mind by drawing a rather homely comparison with the "head", "foam", "froth", "suds" or what the German calls the "schaum" on a glass of beer. If this head of suds is small, dense and creamy it would express our thought of a proper burnishing lubricant soap solution comparison, but if light, high and frothy, the kind the barman scoops off or the drinker blows off, this latter represents the comparison to a profuse heap of useless lather in a burnishing solution.

Now every barrel operator is familiar with the practice of keeping the burnishing material in the barrel fully covered with soapy water while the barrel stands idle. From almost the very beginning of the use of metallic burnishing material this practice has been advocated, and rightfully so, but in some way down through the years this method for preventing burnishing materials from rusting has given rise to the practice of covering the mass of burnishing material and parts to be burnished with anywhere from one to four inches of water in the actual burnishing process.

May we point out here in the following this procedure that the soap flakes, powder, or curd soap is generally tossed into the barrel after the materials, parts, and water. Now at an average temperature of 104 degrees Fahrenheit and using a 40 degree Centigrade titre soap, when the barrel is placed in operation this soap floats on the surface of the water. Even under the most favorable conditions of soft water, proper kind and proportion of soap and correct water temperature, anywhere from three to five minutes will be required for the soap even under agitation in the revolving barrel to go completely into solution. For example, in a high and narrow Type "A" barrel 8x30 inches in size, it will be noted that in one revolution of the barrel the parts to be burnished will travel through the burnishing mass approximately 7 feet and if the barrel is being operated at 20 r.p.m. it will be seen that the parts travel 140 feet per minute and if it requires from three to five minutes for the soap to dissolve and be incorporated into the burnishing mass, the parts would be operated anywhere from 420 to 700 feet through the metallic burnishing material mass practically without or with only partial lubrication.

In the many experiments we have conducted we now recommend the following practice:

1. Level off the burnishing material mass in the barrel without the load of parts to be burnished.
2. Add water until the burnishing material mass is just covered, keeping account of number of quarts or gallons required.
3. Now drain off the water from

the barrel.

4. Add just **one-half** as much water as was required to reach the surface level of the burnishing mass.
5. Add soap—close barrel and operate from three to five minutes.
6. Now open the barrel, add the parts to be burnished and proceed.

The reader's first thought will be that this is an involved operation. In reality it requires merely one additional removal of the barrel cover or lid and three to five minutes of operating time. The difference in results will be marked. Parts, particularly stampings having rough edges will add thousands of scratches to each other in the first few minutes of unlubricated operation, and after lubrication becomes effective it will consequently require longer operating time to smooth out these scratches. You would not operate any piece of machinery from three to five minutes with only water as a lubricant, and lubrication is just as essential when applied to barrel burnishing as when applied to machinery.

Invariably, when an overplus of water is used it will be found that not sufficient soap is added to provide proper lubrication, hence we have a watery solution, and a weak watery solution never was and never will be conducive to the best burnishing results. What we should and must have is a creamy lather in the mass, not necessarily profuse in volume, but containing the p r o p e r lubricating properties.

In connection with this discussion of soap and its relation to barrel burnishing as a lubricant may we stress again the fact that a burnishing soap need not necessarily have powerful detergent properties. To every burnishing barrel operator whether of one or one hundred barrels we would most emphatically emphasize the fact that your equipment is not a combined burnishing barrel and cleaning tank, even though there are far too many of you who so regard it. If you are operating under this delusion we can assure you that you will never secure from your barrels the quality of work or satisfaction the barrel manufacturer planned that you should have, and in addition, you are inviting trouble in every operation following barrel burnishing.

There is a proper as well as an improper method of adding soap to the burnishing mass to assure most rapid dissolution. Assuming that you have the proper quantity of water of the correct temperature in the barrel, do not simply toss in a measure of soap flakes, chips, powder or curd, for by this method, the soap will have a tendency to form into a soft ball or balls and thus retard dissolution. Rather stir the soap into a quantity of cold water, then add this to the mass. You will find that this method provides faster dissolution and distribution throughout the burnishing mass. Whatever else you do — do not stir dry soap in any form into hot water.

To undertake to enumerate all of the various formulas for soap for barrel burnishing various products would require more space than Products Finishing could possibly allot. If you have a definite soap problem it is suggested that you ask Products Finishing for a copy of the Barrel Burnishing Analysis Questionnaire. This covers every phase of barrel burnishing and will enable you to state your problem so that it can be answered intelligently.

In general the soaps most widely used for barrel burnishing lubricants come under the heading of Flake Soap, Soap Chips, Soap Powder and Curd or Semi-Solid Burnishing Soap. We much prefer and have been able to secure the most satisfactory results from Curd Soaps which gener-

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FROM the coarse sizes for the first roughing operations down to the finest sizes for finishing, you'll like the way that Alundum Abrasive will cut polishing costs. Special shaping operations give a fast cutting grain; its high capillarity gives a strong, long lasting wheel head. And special Norton sizing methods assure exceptional uniformity in Alundum Abrasive—grain that gives the surface you want for buffing and plating.

G-34

NORTON COMPANY
WORCESTER, MASS.

NORTON ABRASIVES

ally are of about the consistency of hard butter. They are made with chemically treated water and numerous ingredients are added so that they will function in a wider range of water conditions than any of the dry soaps. They have the important advantage that the lather is held down and the lubrication properties of the soap kept within the burnishing mass where it belongs. They go into solution more rapidly than any of the dry soaps and rinse more freely. Their cost is generally less than one-half that of dry soaps and by weight twice as much may be used, if necessary, at no increase in operating cost.

Curd soaps are tallow base soaps and are always opaque. They should not be confused with oil and potash soaps which are clear or semi-transparent much the same in appearance as the hard milled soaps commonly designated as glycerine soaps when used for toilet purposes. We have invariably found that soda soaps are the most satisfactory for barrel burnishing and give far better color to the work than potash soaps.

Finally it might be of interest to those barrel operators who have never given much thought to the subject that splendid results may be secured by using a light lubricating oil instead of soapy water lubricant. There is no doubt but that such an oil would be widely used were it not for the difficulty of removing it after the necessary finish had been secured. This is simply to show the function of soap as a lubricant acting between the metallic burnishing material mass and the parts being burnished, and not as a detergent.

It is probably expected that a discussion of the use of soap in barrel burnishing should also embrace methods for cleaning the parts prior to placing them in the barrel. There are many reputable manufacturers of metal cleaners for both still tank and electrolytic cleaning who have chemists with years of research experience and who are far more competent than the writer to discuss this phase of metal finishing. We would again wish to stress that if the best results are to be secured in the practice of barrel burnishing, the inner surface of the barrel, the burnishing material and the parts to be burnished must be scrupulously clean, for only in this way the proper results may be assured and the later processes of plating, lacquering or enameling be certain of permanent adherence.

(In the first article of this series, in which the development of barrel burnishing was discussed, the name of N. Ransohoff, Inc., was inadvertently omitted. The company manufactures machines for tumbling, separating, cleaning, washing, burnishing, plating, and pickling of metal parts.)

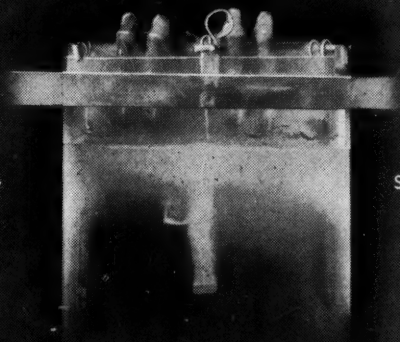
ATC Bulletin G-12. The Automatic Temperature Control Company, Inc., 34 E. Logan St., Philadelphia, is now issuing a bulletin designated as G-12 which describes the Current-Input Controller for close regulation of electrically heated devices such as furnaces, ovens, and platens. This control device was described in a preliminary bulletin No. 136 which was issued a year ago. The new bulletin presents additional information in regard to its use for different applications, with wiring diagrams and ratings. Copy free upon request.

Metallizing Booklet. A 36-page booklet which is said to be a complete photographic story of the metal spraying process is being issued by Metallizing Company of America, Inc., 1351 East 17th St., Los Angeles, Calif. This booklet is said to cover thousands of applications in which metallizing has proven its worth and should be received with interest by those concerned with lowering maintenance costs. Copy free upon request.

"Yes, It's Dust!" is the title of a four-page folder featuring the advantages and economies that are to be obtained through the use of Pangborn Dust Collectors. Four views of Pangborn Dust Collectors in operation at representative industrial plants are shown and the problems involved at each installation are described. Copy free by addressing Pangborn Corporation, Hagerstown, Md.

Electro-Chemical Descaling of Metals

BULLARD - DUNN PROCESS



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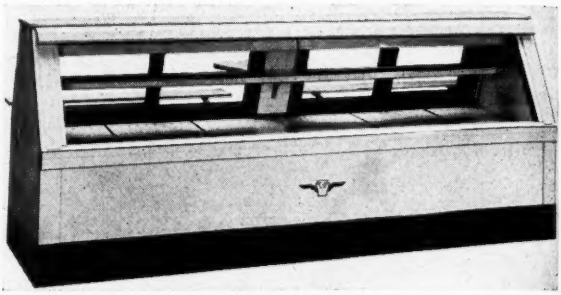
To appreciate the possibilities afforded by this Process, you should see samples of your own work after Cleaning. May we have the opportunity of proving its effectiveness and satisfaction?

BULLARD-DUNN PROCESS DIVISION
of
THE BULLARD COMPANY
Bridgeport Connecticut

FINISHES THAT AID IN APPEARANCE AND UTILITY

(Right)—This counter display case is completely finished with porcelain enamel. All of the porcelain parts on the exterior front, ends and top are fastened so that no screws are visible.



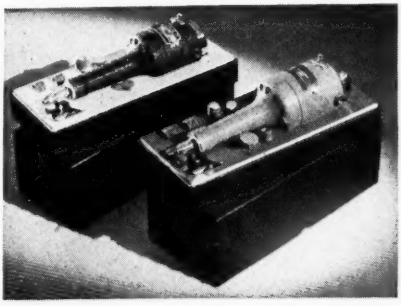
(Photo courtesy Cincinnati Butchers Supply Co.)

(Below)—A decorative exterior is achieved through the use of porcelain enamel building panels for the theater front shown here.

(Photo courtesy Toledo Porcelain Enamel Co.)

(Right)—The molded black bakelite case of modern design is enhanced by chromium plated trim on the meat chopper shown here.

(*Photo courtesy The Hobart Manufacturing Co.*)



(*Photo courtesy The Dumore Company*)

(Left)—With a black or grey crackled enamel finish hand grinders such as these withstand a great amount of abuse without marring or wearing. This type of finish has the advantage of covering up minute holes in the castings.

(*Photo courtesy Sherwin-Williams*)

(Right)—This electric cleaner is finished with a crinkle finish especially formulated to withstand abrasion and scuffing and at the same time to maintain a pleasing appearance.

NEWS *of the* INDUSTRY

Sixteenth Exposition of Chemical Industries

The Sixteenth Exposition of Chemical Industries will be held December 6-11, 1937, at Grand Central Palace, New York, N. Y. Three floors of Grand Central Palace have been reserved and advance leasing to date indicates that the 1937 Exposition will be one of the largest in recent years. Design and preparation of the more extensive exhibits are being carried forward during a period of from 8 to 10 months in advance of Exposition week, and companies leasing the smaller exhibition space are required to make their contracts well in advance in an effort to secure their particular preference in location, with respect to floors, aisles, corners, and entrances.

Indications at this early date point to an Exposition in which the role of chemical industries in the great reconstruction period now under way will be emphasized through the medium of dynamic displays designed to show the coordination of each phase of chemical manufacture with the many industries to which it is related.

A feature of the Sixteenth Exposition will be a prize competition for a slogan typifying the role of chemical industries in modern life. The slogan will be expected to represent accurately the purpose of the chemical industries and the benefits accruing to mankind from their activities. Details of this slogan contest will be announced at an early date.

The Sixteenth Exposition will be under the direction of the International Exposition Company, which will have charge of all matters pertaining to leasing and exhibit arrangement. Mr. Charles F. Roth, who has been similarly responsible for all the previous expositions, will again be personally in charge.

Schneible Appoints Representatives

The Claude B. Schneible Company, 4755 N. Crawford Ave., Chicago, Ill., manufacturers of Multi-Wash Dust Collectors and Multi-Louver Dewatering Tanks, has recently announced the appointment of two sales representatives in the Milwaukee and Eastern Pennsylvania territories. Paul J. Cnare will handle sales in Wisconsin from headquarters in Milwaukee. Mr. Cnare was formerly associated with General Motors Corporation in the Chevrolet Gear and Axle Division.

Charles C. Hermann, formerly with Deere & Company, Waterloo, Iowa, will be in charge of the Philadelphia office, which covers Eastern Pennsylvania, Maryland, Delaware, and a portion of New Jersey. Both Mr. Cnare and Mr. Hermann are well known in the industry, having long been active in association and industrial development work.

Dust Control Equipment Association Elects Officers

Arthur J. Tuscany, executive secretary-treasurer of the Dust Control Equipment Association, has announced that the Association at its recent meeting selected officers as follows: president, H. B. Loxterman, Blaw-Knox Company, Pittsburgh; vice president, M. A. Eiben, Northern Blower Company, Cleveland; executive secretary-treasurer, Arthur J. Tuscany, Cleveland. An engineering committee was also appointed. The duties of this committee will consist of the development of standards of dust control practice. The engineering committee will also be available for consultation by organizations or groups interested in the preparation of codes, and development of regulations. The offices of the Association are still located in the Penton Building, Cleveland, Ohio.

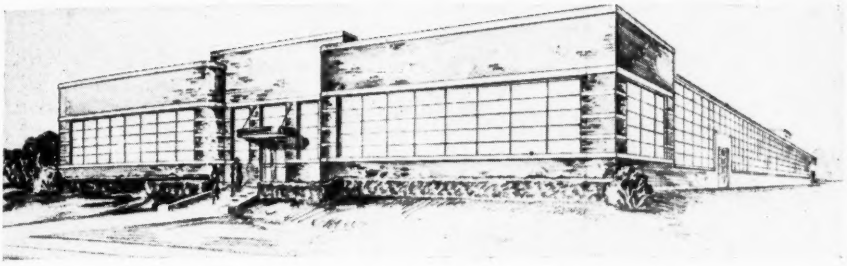
Hoover Appointed Manager of Goodrich Chemical Aids

J. R. Hoover, who for the past six years has served as assistant manager of chemical sales for the Mechanical Rubber Goods Division of The B. F. Goodrich Company, has recently been appointed manager of this department.

Mr. Hoover will take over the duties of Dr. H. E. Fritz who will in the future devote his entire efforts to the development of Koroseal, the synthetic elastic material recently brought out by The B. F. Goodrich Company.

DeVilbiss To Erect New Plant

The DeVilbiss Company, 300 Phillips Ave., Toledo, Ohio, is planning to expand its rubber products division in



New building for Rubber Products Division, The DeVilbiss Company

Toledo by erecting a new plant on Lagrange Street near the Ottawa River.

The new plant will be 120 ft. wide and 440 ft. long of single story monitor design. The improvement is intended to provide the rubber division of the company with a much needed increase in production facilities. This is the third expansion and the second new factory required since the DeVilbiss rubber products division was established in 1924. This division manufactures tubing, bulbs, gaskets, respirator bodies and other items of mechanical rubber goods used in connection with the company's industrial equipment.

Programs for the American Electro-Platers' Society Silver Jubilee At New York Outlined

The Educational Committee has designed its program to meet the practical needs and interest of the foreman plater and the industry. A large portion of the educational program is to be devoted to branch papers, each a symposium of the best practice and most efficient methods in the subject discussed. All the papers have, as far as possible, been selected with an eye for the immediate usefulness and practical application.

Included among the papers which are to be read at the convention are papers on gold electroplating, barrel rolling of metal parts, copper plating in cyanide baths, health hazards in plating room, brass plating, a discussion on barrel electroplating, cathode efficiency of electroplating barrels and its effect on the adhesion of nickel deposits, electroplating practice in Germany, a resume of silver plating, summary of researches on electrodeposition at the National Bureau of Standards, progress report on exposure tests and laboratory tests of plating on non-ferrous metals, the use of color photography in the inspection of exposure tests of plating, a magnetic method for measuring the thickness of nickel coating on non-ferrous metals, lacquer, the pH of alkaline plating solutions, ideas that work in the plating process, and something new in silver plating.

Under the direction of Mr. R. J. Liguori, president of the New York branch, an exhibit of plated ware submitted by the branches and members is being organized.

Among the features of the entertainment program are: Open House as guests of the International Fellowship Club, a bus ride in which the high spots and points of interest in the city will be visited, a tour of Radio City, a visit to a great ocean liner in New York Harbor, a banquet, dancing and floor shows, and an abundance of good fellowship and cheer.

An entertainment program has also been provided for the ladies, which includes banquets, floor shows, bus rides to the high points of interest in the city, visit and inspection of a great ocean liner, shopping tours, a theater party, a bridge party, luncheon at a famous night club, and a visit to the Hayden Planetarium.

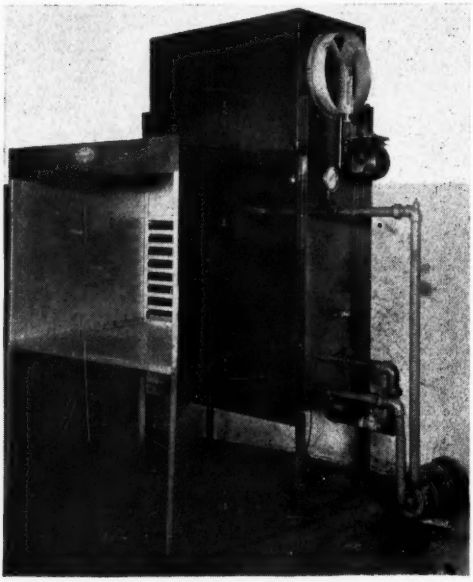
McAleer Announces New Distributor

According to an announcement recently made by Mr. Edw. D. McAleer, vice president of McAleer Manufacturing Co., 2431 Scotten St., Detroit, Mich., the full line of polishing and buffing compositions manufactured by this company will henceforth be distributed in the Chicago territory by Crown Rheostat & Supply Co., 1910 Maypole Ave., Chicago, Ill. A full stock of their high quality compounds on hand will enable them to render quick and prompt delivery service throughout Illinois.

New Plant Equipment and Materials

Water Washed Spray Booth

A recent development in spray finishing equipment has been announced by the Spray Engineering Company, 151 Central St., Somerville, Mass. A battery of spray nozzles is said to thoroughly wash the exhaust fumes, and thus prevent chemicals or inflammable solid matter from passing through the exhaust fan into the outside air. This is said to greatly reduce fire hazard in industrial finishing operations, protect the plant from unsightly deposits of pigments, and prevent damage to adjacent property.



Water Washed Spray Booth

Wet exhaust air is passed through a set of eliminator plates which remove all free moisture, returning it to the spray chamber for recirculation. Make-up water is automatically supplied to replace evaporation losses.

The unit comes in parts which are easy to assemble. It can be furnished in various sizes to meet special requirements. In addition to the Water Washed Spray Booth, a complete line of spray finishing equipment including various types of spray guns, pressure feed containers, air regulating sets, automatic spray finishing equipment, and accessories are available.

A-Lac-O Process

A process to be known as "A-Lac-O" whereby Maskalaco masking paste for use on railroad cars, trucks and auto striping, and all sorts of decorated products where two or more colors are used has been brought out by Cleaveland Laboratories & Manufacturing Co., Inc., 447 Wilson Ave., Newark, N. J.

The A-Lac-O process is a method of finishing products of every description whereby the trim or decoration is applied by using Maskalaco masking paste and A-Lac-O lacquer. The decorative color is first sprayed over the entire surface, the decoration is then masked with Maskalaco masking paste, after which the background color is sprayed over the entire surface. As many colors as desired can be applied.

After the mask has been brushed on over the dry lacquer color, it may be allowed to set for a few minutes and then the next color coat may be applied. Colors must be allowed one hour to dry before applying masking paste over them. After all colors have been applied and masking completed, the article can be washed with a stream of water or with a sponge and water.

In using the A-Lac-O process it is usually better to apply light colors first. For best results, Maskalaco masking paste should be applied with hair quills of red sable, black sable, oxhair, or gray squirrel.

The lacquer used should be sprayed over the mask at not over 40 lbs. air pressure. The air brush should be held 6 to 8 in. from the surface. If desired, the background color can be sprayed first and then the decorative copy can be cut in with masking paste.

Ruby Brite

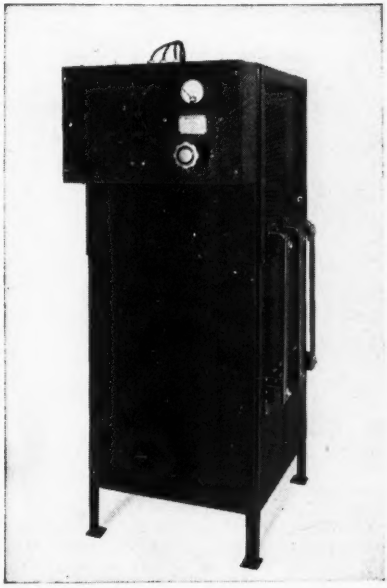
A specially prepared polishing agent that produces a hard, glassy, mirror-like finish, known as "Ruby Brite", has been brought out by Special Chemicals Corp., 32 Irving Place, New York, N. Y. Ruby Brite has been prepared for producing a mirror finish on precious metals, such as platinum, gold, silver, and so on. While it is primarily designed for precious metal finishing, it can also be used on other metals when a mirror finish is desired. Ruby Brite is said to bring up the lustre on silver to a maximum without burning and washes out very easily, leaving no residue.

H-VW-M Copper Oxide Plate Type Rectifier

A copper oxide plate type rectifier has been developed which is said to provide a practical means of converting alternating current into direct current for use in the electro-plating industry. This rectifier is being manufactured by the Hanson-Van Winkle-Munning Company, Matawan, N. J., in connection with the Westinghouse Electric & Manufacturing Company.

A number of sizes are offered which are said to provide a wide range of direct current supply for use in electro-plating operations. The unit consists of power transformers, a small fan for air circulation, rectifier unit, and necessary control equipment. The outfit is also equipped with a De-ion circuit breaker which serves both as a switch and a protection against overloads and short circuits.

Where the equipment is installed in places free from excessive humidity, dirt, and fumes, it is said that years of trouble-free service is the result. Freedom from moving parts, except for a small ventilating fan, keeps maintenance costs of the copper oxide plate type rectifier at a minimum. Additional features of the copper oxide plate type rectifier include a high overall efficiency and high power factor.



H-VW-M Copper Oxide Plate Type Rectifier

DECREASE FINISHING ROOM HOURLY COSTS

PACKER *Automatic*
POLISHING *and*
BUFFING MACHINES

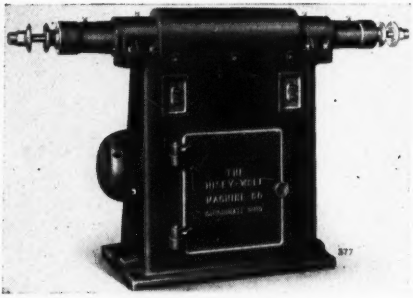
THE PACKER MACHINE CO. MERIDEN, CONN.

WRITE TODAY No Obligation.

INCREASE HOURLY PRODUCTION

Hisey Texdrive Buffing and Polishing Machine

The Hisey-Wolf Machine Company, 2745 Colerain Ave., Cincinnati, Ohio, has developed a new line of buffing and polishing machines in several sizes from



Hisey Two-Motor, Two-Spindle Buffing and Polishing Machine

3 to 25 h.p. The machines are designed for external mounting of the motor, and will accommodate any make or type of motor. The attendant interference of the motor from the top of the pedestal and providing any and all speeds for any size or kind of wheel, regardless of the electric current available, are two outstanding advantages which are made possible by the use of V-belt drive. Other advantages are greater flexibility, quick speed changes, the use of any stock power motor, simple substitution of a larger or smaller motor, or one of different current characteristics to meet changed conditions, and a general refinement of construction details.

Spindles are of one-piece construction, made in special spindle steel, and heat treated when necessary. All Hisey Texdrive Buffing and Polishing Machines are equipped with high-grade oversize ball bearings mounted in closest proximity to the wheels. Each inner race is securely locked individually on the shaft with the use of sleeves or bushings. They are provided with labyrinth seals to exclude dust and grit.

Each bearing has a filler, oil-level and drain. Oil chambers are of liberal size requiring minimum attention. Bearing housings have full length keyway at the top of the column, assuring perfect and permanent alignment. Spindles and bearing housings are removable as an integral unit without disturbing bearings. The machines are made with either one or two spindles and with single or double motor drive respectively.

Amaloy Process

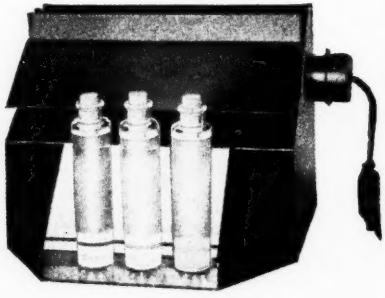
A process whereby the manufacturer of acid tanks, roofing sheets, hardware, electrical fittings, and so on, can coat his products with lead, to be known as the "Amaloy" process, has been brought out by the American Machine & Foundry Company, 55th and Second Ave., Brooklyn, N. Y.

Amaloy is a hot dipping process which coats the base metal with a single solid solution of lead, with all the advantages of pure lead. It is said to permit soldering without tinning. It requires no binding alloy between the lead and the base metals. It is said to be extremely ductile in that it can be repeatedly bent through an arc of 180 deg. without fracturing the coating.

The Amaloy process of lead coating is said to establish a firm bond between the applied lead and the base metal. This bond is extremely tenacious and cannot be broken or flaked from its metal foundation when bent. The process is said to be especially adaptable to applications where moisture, acid fumes, and so on, cause oxidation.

Clark Clarity Tester

A very useful clarity tester for use where cloudy, turbid solutions are important is being marketed by Laboratory



Clark Clarity Tester

Equipment Co., 146 Lafayette St., New York, N. Y.

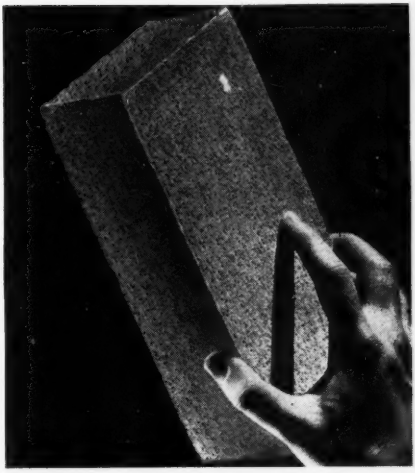
The Clark Clarity Tester can be used for the rapid determination of insoluble matter in chemicals, the estimation of

constituents left in suspension after treatment with solvents, and the estimation of constituents precipitated from liquids by the addition of solvents. It is applicable to any turbidimetric or nephelometric method. It can be used to obtain quantitative results by comparison with known mixtures and suspensions, or suspension in gelatine for use as permanent standards.

The Clark Clarity Tester shows clearly differences of one part per million (0.0001 per cent). It requires only visual side by side comparison of samples in stock bottles. It can be set up close to filter presses to check the clarity of filtrate.

Insulating Brick JM-20

Johns-Manville Corp., 22 East 40th St., New York, N. Y., has recently placed on the market a 2000 deg. insulating brick to be known as the "JM-20". This brick has been developed by the company's research laboratories for use behind refractory walls in various types of high temperature industrial equipment, including steel plant equipment, and practically all types of furnaces. It can also be used for direct exposure at temperatures up to 2000 deg. F. wherever there is no flame impingement, slag action, or mechanical abrasion.



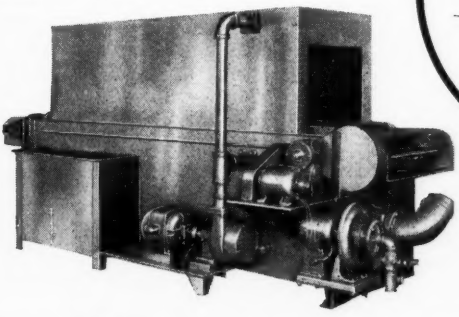
Insulating Brick JM-20

JM-20 has been produced by combin-

SPEED UP ASSEMBLY

Properly cleaned parts speed up assembly and reduce labor costs . . .

The Hobart Washer shown below is particularly ideal in assembly operations where parts must be fitted quickly and accurately with a minimum loss of time . . .



Hobart Model 1418-C Industrial Washer. Standard equipment includes gas heating unit . . . may also be equipped for steam heat.

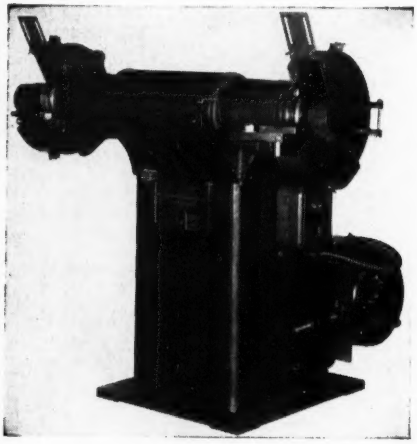
THE HOBART MFG. CO.
Troy, Ohio

HOBART Washing Machines for every Industrial Cleaning Need

ing high quality refractory clay with a specially manufactured fibrous, light weight, inorganic aggregate. It is said to be unusually light in weight, weighing less than 1.7 lbs. per standard 9 in. equivalent. Its heat capacity is unusually low, being less than one-fourth that of ordinary refractories and its thermal conductivity is less than one-sixth that of fire brick.

Production Type 300 Grinder

The Production Type 300 Grinder shown in the illustration, a recent addition to the line of grinders and buffers built by The Production Equipment Company, 5219 Chester Ave., Cleveland, Ohio, is of the overhung selective speed



Production Type 300 Grinder

type. It is similar to the Type 300 buffer, except it is built for grinding duty. The head casting is split, allowing easy removal of the spindle and bearing sleeves as a unit. The head casting and caps are assembled, and then bored for accurate alignment of the spindle bearing sleeves. The sleeves, which contain the heavy duty spindle bearings, are furnished with end castings, and form sealed oil reservoirs of large capacity. Filler, level, and drain are furnished for each sleeve.

The spindle, built of high carbon steel, is of liberal size and is furnished with flanges and nuts. Wheel guards are of the safety type, built of steel, and are adjustable to wheel wear and location of grinding opening. They are supplied with hinged covers, exhaust connection, and spark shields. The ball bearing motor is mounted at the rear of the machine, on a pivoted base which allows for belt stretch. The drive from the motor to the spindle is V belt and is enclosed by a guard.

The starter is of the magnetic type with overload and no voltage protection. The start-stop push button is located on the front of the machine. Motors are furnished in either enclosed fan cooled, or semi-enclosed designs. Distance between inside of wheels is approximately 41 inches. This type of machine allows proper spindle speeds for maximum wheel efficiency. When furnished with quick change sheaves it permits the wear of wheels to small diameters, maintaining proper cutting speeds at all times.

RPC Hammered and Wrinkle Finishes

Rowe Paint Company, 43 Tenth St., Long Island City, N. Y., has recently placed on the market a one coat hammered finish, and a one coat wrinkle finish, both of which are said to be rust-proof, alkali and heat-proof. Both of these finishes are obtainable in practically all colors.

The hammered finish can be had for either air dry or bake. A baking temperature of from 180 up to 400 deg., from 30 to 1½ hours is required. The hammered finish is said to withstand constant heat up to 550 deg. The wrinkle finish requires a baking temperature of 250 deg. for 1 to 2 hours.

Reichert Universal Camera Microscope Type "Me F"

A highly efficient and up-to-date apparatus comprising an ingenious combination of several instruments in one universal camera-microscope for facilitating every possible method of microscopic examination to be performed either in transmitted or incident, ordidary or polarized light, has been brought out by C. Reichert Optical Works of Vienna and is being marketed through their American agents, Pfaltz and Bauer, Inc., Empire State Building, New York, N. Y. The features combined in this instrument make it possible to use it, with very little changing, for visiual work, for photomicrography, for micro-projection, and for micro-drawing and record work. A variety of methods of illumination are available which can be used in any order required.

Incident light is made available as bright-ground illumination by plane glass plate, bright-ground oblique illumination by strip mirror, dark-ground illumination with the light directed concentrically and obliquely, and as polarized light. Transmitted light is made available for bright and darkground illumination and as polarized light. In addition to the usual photomicrographs, slightly enlarged general survey photographs can be made up to a scale of 1:2 with "Neupolar" anastigmatic photographic lenses having focal lengths of 30, 50, 75 and 100 mm. The inverted arrangement of the microscope, when working with incident light, has the advantage that the objects being examined are simply placed on the instrument and need not be mechanically or optically positioned. Generally speaking, this arrangement has the additional advantage that objects of practically any size may be examined. Objects up to 200x200 mm. (8x8 in.) can be examined as they stand.

The coarse focusing, acting on the stage, has check springs and a locking device. The stage can be raised as easily as it can be lowered and the object under examination may be fairly heavy. The coarse focusing has a scale for the working distances of the several objectives, which means that each objective is automatically coarse-focused at the correct distance. The fine focusing mechanism is independent of the coarse focusing and has a zero mark so that the micrometer screw has full freedom of motion up and down.

The light source, camera and microscope are permanently centered with respect to each other so that no tedious preparations are necessary when changing over from visual work to photography. Even when the opaque illuminator is used, the light always remains properly adjusted to the illuminator independent of the microscope setting. The eyepieces for visual work and photomicrography are so accurately matched that the image observed visually appears sharply focused on the focusing screen as well when the measuring eyepiece with adjustable eye-lens is used in the observing tube for correcting errors of vision.

All the fittings are arranged so that they can conveniently be manipulated by the observer sitting in front of the instrument, without the need of remote control devices. The camera focusing screen is directly in the observer's line

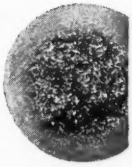
BREAK *for* BETTER BURNISHING

The sledge hammer test gives you proof that Abbott burnishing balls have a wear-resisting steel structure. Longer life means lower finishing costs, because replacements are seldom necessary.

It doesn't pay to take a chance on inferior materials. Play safe by sending your order to Abbott. That's the sure way to worthwhile savings.

The Abbott Ball Co.
1060 New Britain Avenue
Hartford, Connecticut

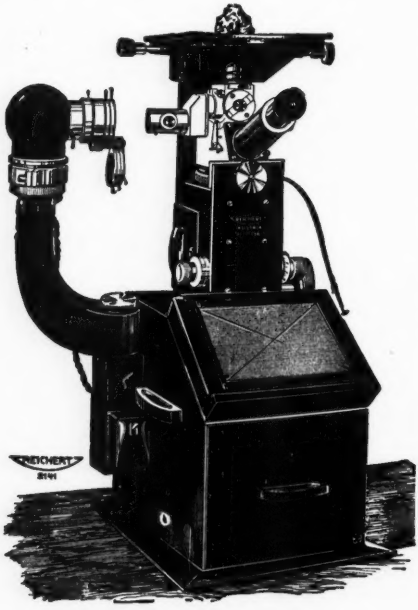
open for inspection



The split ball photographed twice actual size clearly shows how the deep, fine grained tool steel case gradually merges into the tough, shock-absorbing core. Nothing skimpy in that heat treatment. A similar structure backs up the mirror finish of all Abbott materials.

Send for Samples

of vision, being arranged, desk form, at the front of the apparatus underneath the observing tube. It also serves as an observing screen for demonstrating the microscopic image to several observers at once. The bellows length being used, remain rigidly connected to it and act at the same time as arm-rests for the observer. The Universal Camera-Microscope Me F can be placed as it is used in a large cabinet measuring 29x38-x46 cm. (approximately 11½x15x18 in.) and taken from the cabinet again, ready for use, as required. The total weight of the instrument, including accessories and cabinet, is roughly 50 pounds.



Reichert Universal Camera Microscope Type "Me F"

ing invariable, all photographs taken with the same combination of objectives and eyepieces are of the same scale of magnifications and directly comparable. The instrument can also be equipped with an extension camera bellows so as to make it easy to obtain definite magnifications. The entire apparatus is so compactly constructed that absolutely steady images can be guaranteed even at the highest magnifications. The space required for all work which the instrument is capable of doing measures only approximately 10x14 in. area by 16 in. high.

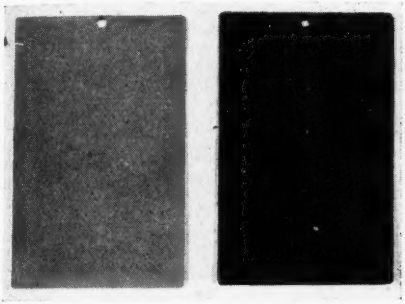
The optical equipment, objectives and eyepieces for visual work and photomicrography in incident light are all housed in the base of the instrument. For equipments provided with auxiliary apparatus, special storage cases are provided which, while the instrument is be-

A special feature of the Me F consists in that the base has been designed to serve as the camera portion of the instrument. This arrangement gives the integral combination of microscope and camera which is so convenient and advantageous in many ways. A drawer in the front of the base contains the incident light objects and the eyepieces for visual work and photography. The spherical lamp casing is well ventilated and light-tight and is fitted with a reflector. It can be pivoted about its horizontal axis or moved up and down so that the lamp can be positioned correctly for the various methods of illumination. Marks are provided to indicate the proper setting of the lamp for the particular type of illumination used. The light source is a 6-volt, 5-ampere low voltage bulb of the closed-coiled filament type connected up to the mains through a resistance in the case of direct current of a transformer in the case of alternating current. Immediately below the microscope is incorporated a self-setting Ibsor shutter for time, bulb and various instantaneous exposure speeds. The holder for the photographic eyepiece is inserted sideways, and can be replaced by a simple cover plate when photomicrographs are being taken. The reflecting mirror located at the bottom of the instrument can easily be taken out and cleaned. The instrument is ordinarily supplied with a rigid bellows giving the same magnification as the visual image, although if desired an extensible can be supplied to give a magnification up to 1-1/3 the visual image.

"Parcolac No. 12"

A staining material, to be known as "Parcolac No. 12", for use in giving Parkerized products a uniform, deep black color has been brought out by Parker Rust-Proof Company, 2193 Milwaukee Ave., Detroit, Mich. In addition to the color, an increase in rust resistance is provided.

Parkerizing is of itself a bulk production process, and this new stain is designed to provide a step in finishing that permits the same bulk handling, and gives color to the product without



(Left)—Illustration showing gray appearance of Parkerized products before staining. (Right)—Illustration showing the deep solid black color provided by Parcolac No. 12.

accumulating streaks or contact marks.

The solution used in applying Parcolac is made up of water and a dry crystalline powder in a heated steel tank of suitable size to take care of the daily production.

With Parcolac No. 12 and a final application of mineral oil, linseed oil, or wax, a beautiful type of final finish is obtained for iron and steel articles.

Oakite Airefiner

A product which aids in the control of bacteria in air conditioning systems, to be known as "Oakite Airefiner", has been brought out by Oakite Products, Inc., 36 Thames St., New York, N. Y.

When added to the recirculating water used to wash or scrub air, Oakite Airefiner is said to keep the wash water sterile and prevents the growth of slime and algae deposits in the system.

Oakite Airefiner is said to be completely soluble, to transmit no odor to water or air, and to provide a stable, colorless solution that is safe and nontoxic. It is non-corrosive to metal surfaces, thus helping to prevent water scale formation. Only small amounts of Oakite Airefiner are required to destroy the bacteria and to keep the water sterile.

Wiregrip Carded Belt Hooks

Armstrong-Bray & Company, 303 Sheldon St., Chicago, Ill., are announcing a new line of Wiregrip Carded Belt Hooks. Wiregrip Belt Hooks are mounted on special processed cards (patent applied for) that hold the hooks firmly in the

Wiregrip Carded Belt Hooks

card, strengthening them and permitting the workman to easily cut off the de-

INDUSTRIAL BASKETS

PICKLING • WASHING
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QUENCHING

ROLOCK, INC.
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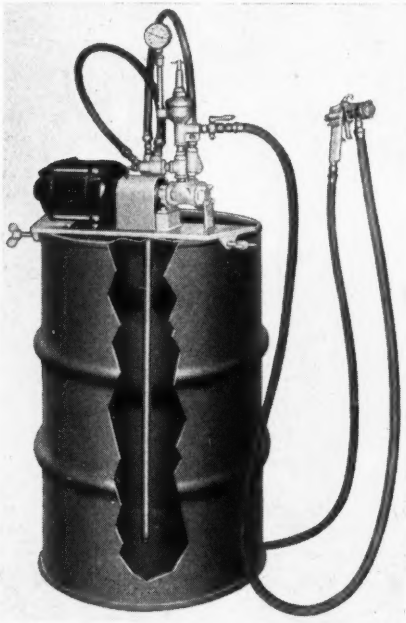
sired number of hooks without destroying or disturbing others. According to the manufacturer, Wiregrip Hooks are made of the finest wire available for this purpose, and will stand long, continuous, hard usage.

Type QB Fluid Circulating Pump

A fluid circulating pump, to be known as the "Type QB", which is said to offer an efficient, economical, and safe method



Type QB Fluid Circulating Pump

of delivering clear varnish, clear lacquer, and other non-pigmented finishing materials from the shipping container direct to the spray gun has been brought out by The DeVilbiss Company, 300 Phillips Ave., Toledo, Ohio. The Type QB is said to eliminate hazards when used on old or weak drums.

The operation of the unit is simple and efficient. The pump draws material out of the drum and generates sufficient pressure in the pump head to feed the fluid to the spray gun at the correct pressure as predetermined. The speed of operation is limited only by the operator's ability to handle the gun.

The Type QB is available in either electric or air driven types, each unit consisting of a strong steel base plate on which is mounted the motor, pump, relief valve, fluid regulator, and a fluid suction and return assembly which can easily be inserted and quickly interchanged in drums with ¾ in. or larger openings.

The unit and hose can be cleaned daily. No dirt or foreign substance can get into the finished material, which is protected by an adjustable sliding collar on the tube entering the drum.

Selfvulc Insulator

Heretofore, a separate primer has been necessary before rubber coatings could be applied to metals or other surfaces for protection against corrosion. The Self-Vulcanizing Rubber Co., Chicago, Ill., manufacturers of self-curing rubber plastics and liquids for protection against corrosion and abrasion has placed on the market an insulator to be known as "Selfvulc". This insulator is said to be a rubber compound which incorporates the quality of a primer with a self-curing, cold curing rubber which can be applied by dipping, spraying, or by hand brushing.

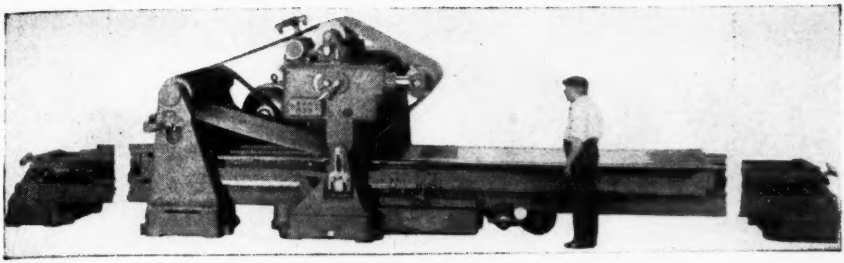
Selfvulc is said to make a steadfast bond in one application although repeat coats to any desired thickness may be added. A vulcanizing period of one hour is required for the first and each of the following coats. There is practically no shrinkage in application, the product being 90 per cent pure rubber and a very smooth, enamel-like finish is obtained on the surface.

In addition to being an insulator and water-proofer, it is said to resist and stop corrosion caused by alkalies, salt solutions, mild acids and their fumes. It can be used for covering girders, ducts, ventilators, hoods, pipes, tanks, vats, tubs, walls, ceilings, bodies and frames of tank cars, structural steel and so on.

Mattison No. 453 Wide Belt Sheet Grinder

The Mattison No. 453 Wide Belt Sheet Grinder, shown in the illustration, product of Mattison Machine Works, Rockford, Ill., is specially designed for the proper application of factory coated abrasive belts to the grinding of stainless steel and other alloy sheets. It is built with precision and care, and has the necessary weight to assure the stability necessary for smooth surfacing.

In addition to producing a fine and



Mattison No. 453 Wide Belt Sheet Grinder

uniform finish, the Mattison No. 453 Wide Belt Sheet Grinder has been designed with the particular object of securing the highest efficiency and longest life from factory coated abrasives. Construction adapts itself for quick application of belts. Push button station and controls for table are located at the front of the machine for easy access by the operator. Contact rolls are removable and rolls of any degree of cushion may be easily substituted according to the nature of the work.

The grinder can be furnished in various widths and lengths. The illustration shows a machine made to carry belt 50 in. wide to grind sheets 48 in. wide by 14 ft. long.

M & W Protective Creams for Workers' Hands

Workmen as a rule do not indulge in beauty treatments, but those in some trades have greater need for cosmetics than their wives and daughters. This is especially true of men who have to handle chemicals, solvents, greases, and oils that destroy the protective secretions of the skin and promote the formation of lesions which are usually painful and may become serious.

To protect its own workers' hands, Maas & Waldstein Company, Newark, N. J., developed two special protective creams, one for use on the hands before beginning work and the other for use after the work is finished. The excellent results obtained by the use of these creams have led this company to place these preparations on the market. The cream to be applied before beginning work is known as Protective Cream No. 1, and the cream to be applied after finishing work is to be known as Protective Cream No. 2. They should be used together. Workers in paints, chemicals, grease, or oils, and painters, machinists, and other mechanics will find that the use of these creams prevents the skin from drying out, cracking, and developing fissures and sores.

Bristol Coordinated Control System

A new system, known as the Coordinated Control System, for automatically operating all of the technical operations and factors of an industrial process has been announced by The Bristol Company, Waterbury, Conn. The system makes it possible to put even the most

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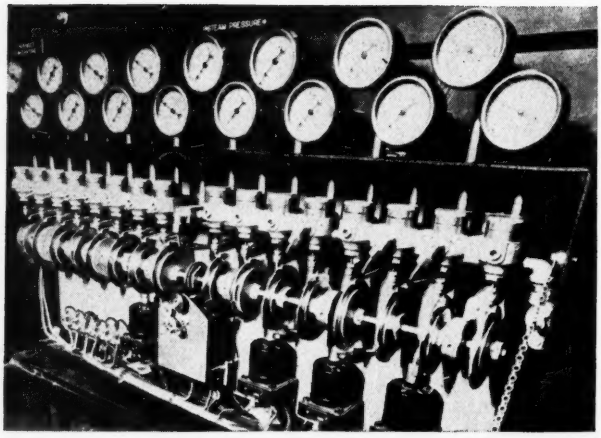
DeWITT OPERATED HOTELS
√
Genuinely Friendly
In CLEVELAND it's
√ The HOLLENDEN
In COLUMBUS it's
√ The NEIL HOUSE
In AKRON it's
√ The MAYFLOWER
In TOLEDO it's
√ The NEW SECOR
For Your Winter Vacation:
In MIAMI BEACH it's
√ The FLEETWOOD



"Mechanical Brain" and Recording and Controlling Instruments of the Bristol Coordinated Control System

intricate scientific process under complete automatic control, thus eliminating the necessity of leaving the manipulation and control of critical operations in the hands of plant operatives.

The control system is intended for processes that are developed and perfected in the laboratory and pilot plant, and which depend on rigid control of such factors as the time of operations of valves (all sizes up to large gate valves), pumps, blowers, dampers, etc., and the control at a definite value or according to a time program of such variables as temperature pressure, liquid level, flow, humidity and speed for their success. It has been found in a number of cases that the Coordinated Control System was the tie-over from the experimental stage to the full-scale plant stage that made for success.

The Coordinated Control System can be applied to any process of which the exact schedule of operation for best over-all results is known — processes which depend upon close control for product quality — processes that give trouble because their schedule of operation is such that operators find it difficult to follow them manually.

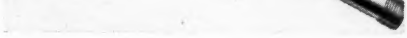
The exact "formula", sequence of operation, or control point of each factor affecting the quality of product and yield recommended by the designer of a process can be built into the Coordinated Control System. The control system carries out each step and controls each factor with split-degree accuracy.

The Coordinated Control System is an automatic machine built in the form of a master control station. It consists of recording and controlling instruments built around the so-called "Mechanical Brain". Each system is designed and engineered for the particular process on which it is used. The instruments are standard instruments selected for their ability to perform a given duty in cooperation with each of the other instruments in the system.

The "Mechanical Brain" coordinates the efforts of instruments and automatically regulates all of the operations in the process. It is in a way the "pace maker" or "monitor" in that it regulates all of the operations, making them take place in their proper sequence and run for a scheduled time.

Binks Thor Model 12 Flow Gun

Binks Manufacturing Company, 3114 Carroll Ave., Chicago, Ill., has brought out a gun to be known as the "Binks Thor Model 12 Flow Gun". This gun is said to be designed for the application of sealing compounds such as rubber cement, cut-back and emulsifying as-



Binks Thor Model 12 Flow Gun

phalts and similar heavy materials. It uses no atomizing air, but simply "flows" the material under air pressure from a pressure material tank.

The flow gun can be used as a sealer gun for application of material around

moldings and crevices on automobile bodies, refrigerators, and so on. It can also be used to lay heavy stripes of paint where spray application would be practically impossible. The No. 12 Gun can be furnished with nozzles which will lay a heavy line from ¼ in. to 6 in. in width.

The air pressure on the tank can be varied with the viscosity of the material and the length of hose used. For sealing materials in ordinary use with 15 to 20 ft. of ½ in. material hose, the recommended air pressure is from 15 to 20 pounds.

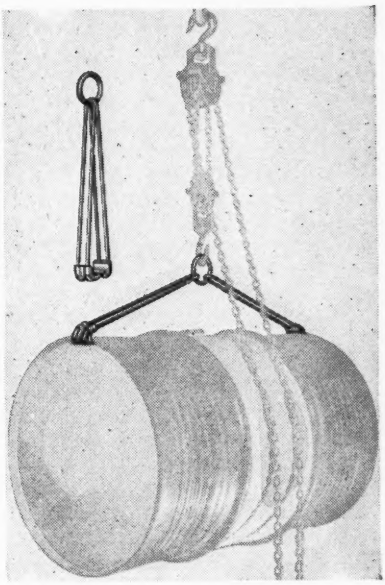
One of the outstanding features of the gun is the almost straight passage from material inlet to the nozzle. Thus, the possibility of clogging is reduced to a minimum. The nozzle can be swiveled in any desired direction. The material connection is standard ½ in. pipe thread. Nozzles for this gun are ¼ in., ⅜ in., and ½ in. round. Special nozzles can be built to individual specifications either flat or round.

Plating Rack Insulation

A flexible rubber for insulating racks used in nickel, cadmium, zinc, and plating solutions other than chrome has been brought out by Collord, Inc., 7049 Lyndon St., Detroit, Mich. This insulating material is said to be tough, flexible, and to bond well with metals other than copper and does not plate back or "tree" in any solution. A thin coating is said to provide adequate insulation. The application of this material is made only by Collord, Inc.

Morse Drum Lifting Hook

Morse Manufacturing Co., Inc., Syracuse, N. Y., has brought out a lifting hook for lifting barrels and drums with chain block and tackle for use with an overhead track, or for handling drums with a service car equipped with a crane. The hooks are light and strong and easy to handle. The wide malleable iron hooks are assembled with a welded steel ring. The lifting hook weighs 2¾ pounds.

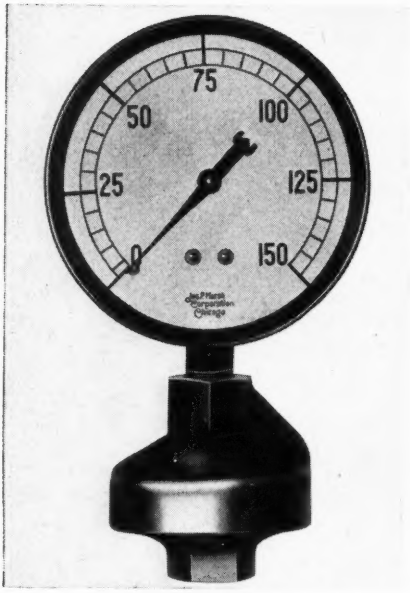


Morse Drum Lifting Hook

Marsh Diaphragm Attachment Gauge

A Diaphragm Attachment Gauge for use on viscous liquids such as paint, varnish, lacquer, grease, tallow, glue products, tar products, plastics, and so on has been placed on the market by

FINE BRONZE POWDERS AND ALUMINUM PASTE
FOR ALL PURPOSES
COLOR CARD AND DESCRIPTIVE MATTER UPON REQUEST
CRESCENT BRONZE POWDER COMPANY
120 W. Illinois Street Chicago, Ill.
Specialists for
Metal Finishing Bronzes



Marsh Diaphragm Attachment Gauge

the Jas. P. Marsh Corporation, 2073 Southport Ave., Chicago, Ill. It can be used to indicate either the pressure or liquid level.

This instrument is suitable for measuring pressure of corrosive fluids or vapors and combines the accuracy and dependability of the bourbon tube gauge with the non-clogging feature of the diaphragm unit. The system is filled with a non-freezing, non-compressible liquid. Any pressure applied to the diaphragm causes the liquid to operate the bourdon tube and movement, resulting in accurate and sensitive indication of pressure changes.

When intended for ordinary service where there is no excessive vibration or pulsation, this instrument can be constructed with standard gauge movement. In service where the instrument is to be subjected to considerable vibration, a heavy duty movement is incorporated.

Carbondale Air Conditioning Units

A line of air conditioners with a wide range of air and refrigeration capacities has been announced by the Carbondale Division of Worthington Pump and Machinery Corp., Harrison, New Jersey.

The manufacturer states that these units are built on field-tested standardized designs. Each element is a complete and separate section in a compact cabinet, making assembly easy and speedy. One section is said to contain the complete fan assembly with motor, another the complete coil and humidifying assembly, and another the base and cleaning elements. Any section may be shipped or handled separately.

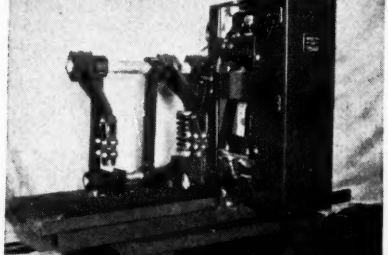
A complete air conditioning job, including cooling and dehumidifying, heating and humidifying, cleaning and air circulation is said to be accomplished by these units. They are available with or without humidifying and heating elements.

All moving parts are readily accessible without dismantling the unit. The cabinet is constructed of heavy steel frames, coated inside and out with water-proof and sweat-proof insulation. The outside surfaces are finished in a rust-resisting enamel to present a smooth and attractive finish.

G. E. Mechanism for Type FH Oil Circuit Breaker

A new and improved operated mechanism for the Type FH line of oil circuit breakers has been announced by the General Electric Company, Schenectady, N. Y. Designated as the MK-110, the new mechanism supersedes the Type MK-10. By increasing the opening springs and modifying the trip-mechanism to reduce the friction, faster opening time is obtained. This permits rating all breakers—600 amperes to 4000 amperes inclusive—at eight cycles.

Other improvements in the mechan-



G. E. Mechanism for Type FH Oil Circuit Breakers

ism include an easily operated hydraulic device for manual closing. It is portable and can be operated by one hand. The centrifugal mechanism has been modified to give greater rigidity and ease in alignment at all motor speeds. An improved cut-off switch, more easily adjustable, has been provided. Both the motor and the cut-off switch of the Type MK-110 mechanism are interchangeable with the motor and cut-off switch of the Type MK-104 unit, used with outdoor and indoor breakers.

"Metex Grade R"

A cleaning compound which is known as "Metex Grade R" is being marketed by The Udylite Company, 1651 E. Grand Blvd., Detroit, Mich. Metex Grade R is a general purpose, metal cleaning compound employing what are said to be the latest and most efficient types of wetting and penetrating agents.

These are chemically compounded with alkali bases to secure a product in which all constituents are equally balanced. The chemical mixture of this compound is said to guarantee uniform composition. The last pound in the barrel is identical with the first. This cleaning compound is said to contain a minimum of moisture and to have less tendency to absorb moisture when the material is exposed.

In the composition of Metex Grade R is incorporated a special buffer agent which greatly increases the life of the cleaning bath before replenishment becomes necessary. This material causes the alkali to split off progressively instead of reducing the energizing salts at once, thus the detergent properties remain active over a long period of time.

Cesco No. 90 Healthguard Respirator

Recently developed, and approved by the United States Bureau of Mines, is a respirator for use particularly in Type "A" dusts (those tending to produce silicosis). This bears the name of Cesco No. 90 Healthguard Respirator and is an entirely new development.

The filtering element removes all dust, even of microscopic fineness, yet allows free passage of air. There is only one filtering surface, of large area; and a supersensitive outlet valve permits no inside air pressure. Hence users report no apparent resistance to easy breathing.

Of equal importance with the filter, as a precaution against breathing dust, is the seal at the facial contour. This seal is effected with the aid of a soft metal band which serves the additional purpose of so reducing the headband pressure that it is no longer noticeable.

Cesco No. 90 Healthguard Respirator

The respirator is manufactured by the Chicago Eye Shield Company, 2300 Warren Blvd., Chicago, Illinois.

PUT YOUR OLD BUFFS TO WORK

• Don't discard your worn buffs. Have six of them cut into sectors and mounted on a steel hub. The result is a large size buff which cuts faster, lasts longer and costs less. Send your old 8" or 9" buffs and we will send the complete units back for your own trial.

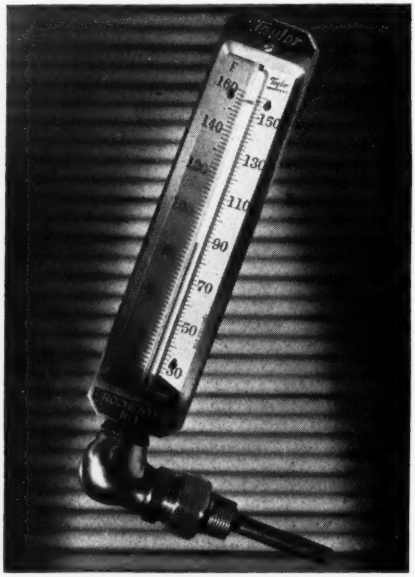
Write for information.

J. J. SIEFEN CO.

Everything for Polishing and Plating
1936 W. Lafayette Blvd.
DETROIT • MICHIGAN

Taylor Industrial Thermometers

A "mercury in glass" Industrial Thermometer which is said to have a uniquely designed thermometer tube which is extremely easy to read has been brought out by Taylor Instrument Companies, Corner West Ave. and Ames St., Rochester, N. Y.



Taylor Industrial Thermometer

The thermometer tubing, known as binoc, is said to be an outstanding achievement of modern optical science. A maximum angle of vision combined with high magnification of the mercury column is said to be possible with this type of tubing. Binocular vision, that is, readability with both eyes, is possible at normal or greater than normal distance. A triple lens construction gathers a maximum of light and concentrates it behind the mercury column, making the column stand out in sharp relief. Confusing empty-bore reflections are said to be eliminated by the scientifically determined lens angle and extended opaque background.

The legibility of the Taylor Industrial Thermometers is further improved by the bold, black numerals and graduations on the cream tinted, non-tarnishing scale. Thermometers of this type are available in all popular straight, angle, and handled forms.

SPEKWITE
LUSTROUS WHITE DECORATIVE PLATE
Tarnish Resistant — Long Wearing Qualities. Costs less than Nickel or Chromium. Greater eye appeal at lower cost. Write for Bulletin.
SPECIAL CHEMICALS CORP.
32 IRVING PL. • NEW YORK

Varzite

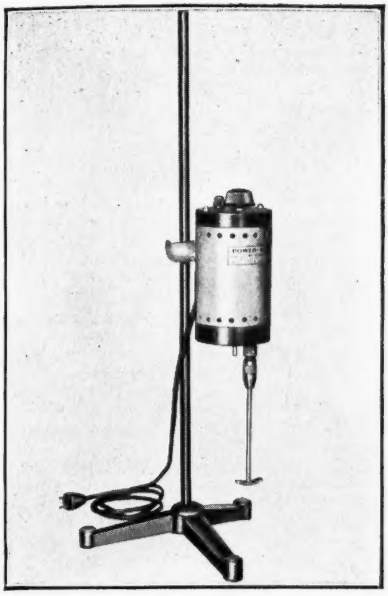
An electrolyte which is said to assure a nickel deposit having a fine crystalline structure, clear white surface, without high spot burns and free from hairline edge cracks, to be known as "Varzite", has been developed by Munning & Munning, Inc., 202 Emmett St., Newark, N. J. The deposit is said to be tough and non-brittle and to form an ideal base for chromium plating.

Varzite is said to have a wide pH and current density range and good drawing power. This solution serves as a general purpose bath that gives complete and protective coverage on white metal alloys and zinc base die castings as well as on brass, copper, steel or iron. Old solutions may be easily converted into a Varzite bath. Varzite is a nickel plating preparation sold in salt form. As an additional agent to serve the function indicated by its name, Varzite Stabilizer is available.

Power Mixer

A combined low and high speed, heavy duty laboratory mixer, to be known as the "Power Mixer", has been brought out by the Laboratory Equipment Co., 148 Lafayette St., New York, N. Y. Due to a special gearing, extra power is obtained that aids in mixing very viscous and sticky liquids. Finger-tip control is provided for its hundreds of different speeds which can be adjusted from 1 to more than 2500 r.p.m. A fuse box prevents danger when overloaded.

The motor can be run in eight different positions, and can be swung through a complete circle with 45 deg. stops. The unit is made of Bakelite, aluminum, bronze and Monel. The chuck is equipped to hold glass as well as metal shafts.



Power Mixer

The stamp is said to have the advantage liquids and will run 24 hours daily without attention or damage. No lubrication is required. The motor operates on A.C. or D.C., 110 volts, 25-60 cycles.

Two drive shafts are provided, one for lower and one for higher speeds. An on-off switch is incorporated in the rheostat. Special thrust bearings are provided to relieve strains.

Nopco Heresite Coatings

A flexible, corrosive-proof coating material which will adhere to various metals, to be known as "Nopco Heresite", has been brought out by National Oil Products Co., John and Gammon Sts., Harrison, N. J. Nopco Heresite Coatings are said to offer protection against acids, mild alkalies, organic materials, oils, and numerous metal corroding substances. Such articles as shipping containers, electric motor coils, aluminum parts, exhaust fans, electric motors and pumps, textile machine parts, and numerous other metal parts which come in contact with corrosive chemicals and fumes can be successfully coated with Nopco. Of special interest to the electrical industry is the high heat resisting and insulating properties of the coatings.

Lea Bulb Type Pump

The Lea Mfg. Co., 14 Cherry St., Waterbury, Conn., has placed on the market a Bulb Type Pump for drawing acids and other corrosive liquids from carboys and other similar containers. The tubing used is made of glass which is resistant to a great extent to the corrosive acids and alkalies.

The Bulb Type Pump operates on a pneumatic pump principle and applies the proper pressure to the surface of the liquid. Normal capacity is said to be about 2 gpm but higher capacities are obtainable by more rapid manipulation of the bulb. A relief valve can be opened to vent the unused pressure. It is stated by the manufacturer that no noxious or dangerous fumes are given off with this type of pump.

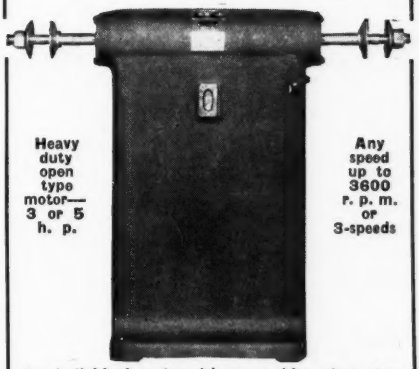
Numberall Heavy-Duty Rotary Stamp

A rotary type of numbering stamp intended for the deep stamping of iron, steel, bronze, and other metals, whether in the form of bars, sheets, castings, or

MARSCHKE

(Formerly Van Dorn, Black & Decker)

SELECTIVE SPEED BUFFER



Heavy duty open type motor— 3 or 5 h. p.

Any speed up to 3600 r. p. m. or 3-speeds

An individual motor driven machine that gives you profitable flexibility.

Write for Catalog.

Vonnegut Moulder Corp.

1811 Madison Ave. Indianapolis, Ind.

ingots, is being placed on the market by the Numberall Stamp & Tool Co., Huguenot Park, Staten Island, N. Y. The stamp is said to have the advantage

Numberall Heavy Duty Rotary Stamp

of providing a full set of numbers, the letter X and a dash, all in one tool. It will therefore do the work of eleven separate character stamps.

All characters are indicated on the front side of the wheel, so that any number can be easily located. Changes in settings are made by simply turning the wheel with the thumb and forefinger. The weight of the stamp is less than one-half that of a set of single figure stamps; however, it is sufficient to permit heavy-duty use.

As stamp consists of three pieces, the blows are delivered indirectly on the work. It is claimed that, because of this, a very deep mark can be made with a single blow. Extra numbering wheels can be furnished, but the wheel is designed to last as long as the hammer-steel shank.

This rotary stamp can be supplied in sizes with numbers from ¼ to 1 inch in height.

MASKALACO
A MASKING PASTE

For use in multicolor lacquering, painting, enameling, screen processing, etc. Striping and decorating more effective—less costly—with Maskalaco. Write for full details and sample.

CLEAVELAND
LABORATORIES & MFG. CO., INC.
447 Wilson Ave., Newark, N. J.

Spekwite

A tarnish resisting, white plate that is said to require no polishing after plating, known as "Spekwite", is being marketed by Special Chemicals Corp., 32 Irving Place, New York, N. Y. Spekwite plate is white in color, precious looking and lasting in its beauty because it is tarnish resisting.

Spekwite is said to be harder than nickel for the same thickness. A polished piece of work plated with Spekwite will not tarnish for at least a year while exposed to the air. Spekwite requires little investment in equipment, an iron tank serving both for plating bath and the anode. The average plating time is one minute. It is said to be ideal for basket plating since it penetrates to deep recesses. It will plate directly over nickel, German silver, brass, copper, gold, silver, iron and steel. Soldering and welding can be done on work that is Spekwite plated.

Spekwite finish is ideally adapted for novelty jewelry, metal novelties, housewares, fixtures, reflectors, radio parts, optical frames, umbrella frames and handles, watch and clock parts, wire products, metal stampings, screw machine products, tools and so on.

M. S. A. Comfo-Respirators

The Mine Safety Appliances Company, Pittsburgh, Pa., has placed on the market two models of the M. S. A. Comfo-Respirators, one to be known as the "Dust and Mist Respirator" and the other as the "Comfo Lead Dust Respirator".

The Dust and Mist Respirator is designed to safeguard workmen against pneumoconiosis-producing or nuisance dust whether dry or supported in a water mist. In addition to silica, coal, iron, asbestos and other dust particles of similar type, the respirator will protect the wearer against inhalation of mist produced in spraying operations with vitreous enamels whose liquid vehicle does not release harmful gases or vapors.

The Comfo Lead Dust Respirator is said to provide protection against the inhalation of mechanically generated lead dust. The filter disks for these respirators are made from a cellulose material specially processed and treated for the purpose. The complete filtering medium consists of a cellulose filter and a filter screen in each filter case which is designed to protect the wearer against dust particles down to a fraction of a micron in size, (a micron being 1/25,000 of an inch), and at the same time providing unusually long filter life.

Due to refinement in design and in choice of materials, the Comfo Respirators weigh only a trifle over 5 oz. The units may be completely sterilized. The position of the filters, as well as the head straps, assures non-interference with vision and working freedom, and allows the wearing of spectacles, goggles, welding helmets, or head coverings of any kind. The soft, flexible in-turned edge of the face piece assures a comfortable fit and an air-tight seal.

The filters are of unusually large area. The immediate effect is to give better balance on the face, to provide unrestricted vision downward, and to improve both the breathing resistance and the filtering efficiency.

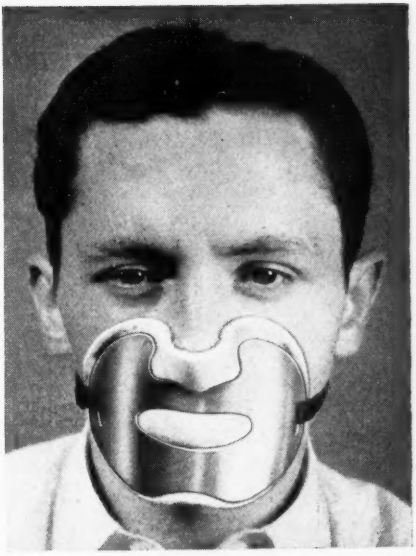
Purico Wonderbar

A pre-saponified composition for buffing and polishing to be known as "Purico Wonderbar", has been placed on the market by The Puritan Manufacturing Co., Waterbury, Conn. This composition is said to remove difficulties when used on pierced, grooved and filigree work, and in other places where the work cannot be satisfactorily cleaned, and the plate peels. Since Purico Wonderbar is pre-saponified it is said to clean in a minimum of time. The binder of Purico Wonderbar is pre-saponified so that it washes absolutely clean regardless of the type of work. This composition is said to save washing, reduce rejections, and at the same time clean easily and fast, and not tarnish the work.

Binks No. 10 Pad Type Respirator

Binks Manufacturing Co., 3114 Carroll Ave., Chicago, Ill., has brought out a light weight, efficient respirator to be known as the "No. 10 Pad Type".

The respirator consists of a flexible aluminum frame which holds a specially treated pad over the operator's nose and mouth, conforming to contour of the face. It is said to have excellent protective features combined with extreme lightness. The pads are easily replaced. Full vision is permitted and working freedom is unhampered.



Binks No. 10 Pad Type Respirator

Walker-Turner Flexible Shaft Grinder

A ½ h.p., heavy duty, flexible shaft grinder now being offered by Walker-Turner Co., Inc., 2137 Berckman St., Plainfield, N. J., uses a minimum of floor space and will do innumerable jobs. A special telescopic column permits the shaft to be raised 15 in. The

Keeping pace with modern manufacturing
STREAMLINED
DUST REMOVAL
SYSTEMS
..Have More Suction at Machines.
... for Grinding Polishing, Buffing Machines. Fume and Ventilating Systems
YOUNG AND BERTKE
1090 HULBERT, AVE. COMPANY CINCINNATI, O.

normal height is 42 in. while the full height is 57 in. The flexible shaft is 5 ft. 4½ in. long, rubber covered, with an SKF ball bearing hand piece. The

Walker-Turner ½ H.P. Heavy Duty Flexible Shaft Grinder

motor is mounted on a swivel attachment, but may be locked in any position. The deep base acts as a tool tray. SKF ball bearings are used throughout this inexpensive machine.

Quaker Solvenol No. 5

The Quaker Chemical Products Corp., Conshohocken, Pa., has placed on the market a solvent to be known as "Solvenol No. 5" to be used in removing polishing compounds and buffing dirt from all kinds of metal prior to the regular alkaline cleaning and plating cycle, for the removal of mineral and fatty oils in washing machines prior to assembling, lacquering, or painting, and for the removal of heavy accumulations of oils, petrolatums, waxes and dirt in a soak tank before regular alkaline cleaning.

Solvenol No. 5 is said to be a combination of sulfonated products and solvent. When mixed with water, it makes a white emulsion and has extreme degreasing and wetting out properties.

McAleer

● The extensive McALEER line of buffing compositions and lacquer rubbing compounds is well recognized for its quality, economy, and uniformity.

For complete details write to McALEER—the headquarters for dependable polishing and buffing supplies.

McALEER MANUFACTURING CO.
2431 SCOTTEN AVE.
DETROIT, MICHIGAN

Rubalt No. 133

A rubber base wrinkle finish that is said to have unusual chemical resistance, to be known as "Rubalt No. 133", is being marketed by Alfred Hague & Co., Inc., 233 37th St., Brooklyn, N. Y.

Rubalt No. 133 comes in colors as well as the standard black. It is said to require no primer or under-coat even when used on furniture steel. The thickness of the applied material determines the depth of the wrinkle effect. At a baking temperature of 250 deg., 30 minutes is required. Longer bakes at lower temperatures can also be employed. The final finish is exceedingly tough and yet flexible.

Norris Airless Painting Machine Model N-1

The Electrical Painting Equipment Co., Inc., 247 Park Ave., New York, N. Y., is offering a mechanical painting unit known as the Norris Airless Painting Machine Model "N-1". This unit which is an airless, centrifugally operated machine is said to eliminate paint fog.

With this machine, practically all kinds of long and short oil paints and enamels may be used, producing a stripe varying in width from ½ to 18 in. The flow and density can be regulated by means of a paint control device. At the option of the operator, the cut-off on each of the four sides may be held to a practically sharp line, making it possible to paint up to moldings and trim or the edge may be feathered in order to avoid any overlap.

Special types of work handled by this machine include stenciling. It lends itself readily to a variety of industrial uses, such as barrel painting or striping and other mechanical operations where

an absolutely even deposit of material is required.

Excelbrite

The Excelsior Varnish Co., 1238 W. 74th St., Cleveland, Ohio, has brought out a ready mixed aluminum paint to be known as "Excelbrite". Excelbrite is said to give a smooth bright finish, even after long standing, and does not deteriorate or give a rough, dull finish. An extra bright, smooth, silvery finish can be produced. Excelbrite is suitable for brushing, spraying, or dipping. It is highly heatproof and also highly waterproof.

Type COM Blower

A blower of unique design, to be known as "Type COM Blower", has been brought out by the L. J. Wing Mfg. Co., 154 West 14th St., New York, N. Y. By a 2-stage combination, the pressures (6 in. or 7 in. w.g.) and volumes required for forced draft and similar work are obtained at low, quiet, constant speeds. The regulation of the air volume is secured by built-in control and redirecting vanes. The COM Blower is of simple construction, compact, efficient, and has the driving motor self-contained. The units are built for both horizontal and vertical mounting.

The COM Blower consists of a constant speed electric motor, with double extended shaft. Two propeller type fan wheels are provided, one mounted on each of the two extended shafts. An integral damper control and air redirecting mechanism is built in between the two propeller fan wheels. The unit is assembled within a simple, rugged cylindrical casing, arranged for ready accessibility.

This type of blower is applicable for hand-fired boilers, stoker-equipped boilers, oil or gas-fired burners, or for the secondary air supply of pulverized fuel burning boilers. The integral damper mechanism permits precise control of the air delivery over a wide range with decreasing horse power.

The control dampers may be readily effected manually, or control can be obtained automatically by attachment to any of the standard automatic draft controls. The throw of a switch starts the blowers and all capacity regulation is obtained by merely adjusting the integral damper.

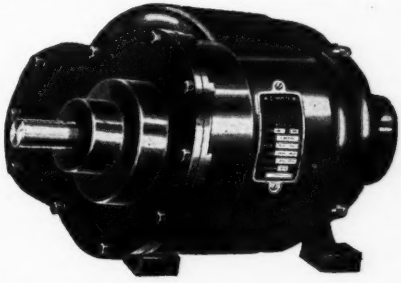
Due to the compactness of the units, they can usually be installed in the brick setting or concrete foundation walls of the boiler, thus all duct work is eliminated. When floor mounting is required, suitable feet are provided.

Hylow Permaglo

A finish which, in all respects compares favorably with the high temperature, long baking, glyptal synthetics, to be known as "Hylow Permaglo" has been placed on the market by the Grand Rapids Varnish Corporation, Grand Rapids, Mich. A particular feature of this material is that it presents a hard surface immediately upon emerging from the oven, thus reducing and eliminating mars resulting from handling. Finishes of two or three coats are available to manufacturers whose products require those qualities generally associated with high baking synthetics.

Foote Bros. Fractional Horsepower Motorized Speed Reducers

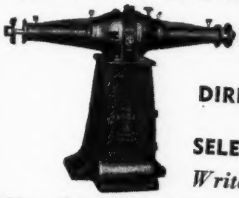
Foote Bros. Gear and Machine Corporation, 5303 South Western Blvd., Chicago, Ill., has added to its standard lines



Foote IXL Fractional Horsepower Powered Gears

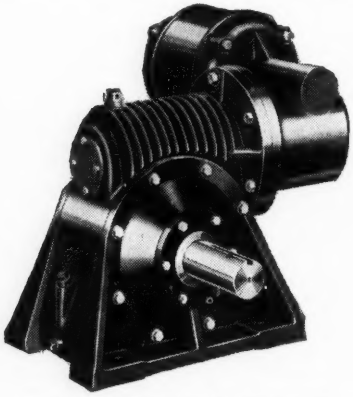
a complete line of fraction horsepower motorized speed reducers, to be known

Buffing & Polishing Lathes



½ H.P. TO 20 H.P.
DIRECT DRIVEN
and
SELECTIVE SPEED
Write for Catalog
The Standard Electrical Tool Co.
1941 W. 8th St. Cincinnati, Ohio

as IXL Fractional Horsepower Powered Gears. These units range in size from 1/50 h.p. up to ¾ h.p. and in ratios from 2.1 up to 8000:1. The various types include single and double reduction worm gear, single reduction helical gear, and combination worm gear and planetary gears at higher ratios. The units are sturdily built and of symmetrical design.



Foote IXL Fractional Horsepower Powered Gear

Economy Abrasive Holder

To facilitate the operation of hand polishing with abrasive cloth, Keeler Manufacturing Company, 2410 S. Kecler Ave., Chicago, Ill., has brought out a line of abrasive holders, consisting of four different shapes, for holding abrásive cloth or paper while polishing.

The holder is made of 0.025 gauge cold rolled sheet steel, tin plated, with a comfortable and smooth gumwood grip handle. The overall length of the holder is 13¼ in. The metal shank is 9¼ in., tapering slightly from the tip to the grip. The holder, though sturdily constructed, weighs only 3½ ounces.

The shank is slotted the full length to accommodate quick and efficient interchanging of abrasive cloth and paper which can easily be slipped on; thus the abrasive cloth or paper is held firmly and snuggly to the shank. The holders are made in four shapes: round, square, triangular and flat. Abrasive refills are obtainable in all types and grits. The holders are packed singly, in individual cartons, and in a larger carton containing the set of four.

THE M-B SUPER SPEED AIR GRINDER

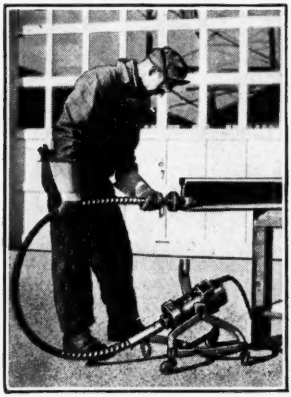
Has an amazing speed of 100,000 R.P.M. Small-Light-Compact. Just the tool for getting into small, difficult places. Write today for full details and 10 day trial offer.

M-B PRODUCTS

126 E. Larned St. Detroit, Mich.

Mall Tool Universal Grinder

The Mall Tool Company, 7740 S. Chicago Ave., Chicago, Ill., has announced a 1½ h.p. flexible shaft grinder to be known as the "Universal" Grinder.



Mall Tool A.C. and D.C. Universal Grinder

The universal operates at 9,000 r.p.m. on either 110 volt A.C. and D.C. or 220 volt A.C. and D.C. currents. It is said to deliver high speeds together with high horsepower to the working tool. With the high speed Universal Grinder, a 4 in. wheel will accomplish the same results as an ordinary 8 in. wheel, according to the manufacturer.

The Universal Grinder is recommended for surfacing and snagging castings, grinding stainless steel, and such other grinding jobs as found in most industrial plants.

Mention PRODUCTS FINISHING when writing to advertisers.

Brown Flow Meter Catalog No. 2004. This catalog is now being issued by The Brown Instrument Company, Wayne & Roberts Aves., Philadelphia, Pa. The complete line of Brown Flow Meters, which includes the indicating, recording, and integrating, in both electrical and mechanical types, together with Brown Air-o-Line Flow and Liquid Level Controllers, are described and illustrated in this catalog. Their application to power plant, water works, gas generation service, as well as to general industrial use is clearly explained.

Catalog No. 2004 describes in simple, non-technical language, the operation of Brown Flow Meters and the construction of the Brown Orifice Plate. Similarly described are the features of both electrical and mechanical types of Brown Flow Meters, the inductance bridge principle, the features of Brown electric meter bodies for use on working pressures as high as 5000 lbs. per sq. in. and as low as 50 lbs. per sq. in. The Brown area meter bodies (cast iron for pressures up to 250 lbs. per sq. in. and cast steel for pressures up to 600 lbs. per sq. in.), the Brown mechanical meter bodies for pressures up to 2500 lbs., the Brown pressure chamber assembly in all types of meter bodies, the six interchangeable range tubes which facilitate range changing in Brown electrical and mechanical Flow Meters, Brown Flow Meter Charts of both square root and evenly graduated types, electric chart drives as well as the hand-wound type, automatic Planimeter, integrator dial of five-figure counter type, the Brown universal case which is interchangeable for wall, front of board, or flush mounting, the Brown water level gage for high pressure steam boilers, and the indicating scale for Brown Recording Flow Meters, are described and well illustrated. A copy of Catalog No. 2004 will be sent upon request.

Leeds & Northrup Silver Anniversary Micromax Recorder. A novel piece of literature devoted to the Silver Anniversary Micromax Recorder which is built by Leeds and Northrup, 4934 Stenton Ave., Philadelphia Pa., is now being issued by this firm. In order to more effectively demonstrate the features of the Micromax Recorder, the piece is made to the actual shape of the recorder and is put together in such manner that the effect is very similar to that that would be achieved by placing a half-size model of the recorder in the hands of the user or prospect.

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WONDER BAR
(TRADE MARK)

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A PRE-SAPONIFIED COMPOSITION for BUFFING and POLISHING

Here's the ideal compound for work with grooves, recesses, filigree, etc. Washes easier, faster . . . leaves work absolutely clean . . . will not tarnish . . . needs no scrubbing—because it's *pre-saponified.* A trial will convince you. Write for circular.

Choice territories open for jobbers.

The Puritan Mfg. Co.
WATERBURY, CONN.

METAL CLEANERS—PLATERS SUPPLIES

The front of the piece, representing the door of the case, is opened revealing the inner mechanism. A second panel illustrating the chart carriage can be swung out in the same manner that the carriage would be swung on the actual instrument, and finally the whole mechanism can be swung into view just as it would be in an actual Micromax Recorder. Inside and out, each unit is seen in true perspective with the chart and record in color. Though its range is that of a typical temperature recorder, the model demonstrates equally well the automatic indicating and recording of any of a wide variety of process conditions — n o t only temperature, but chemical concentration, pH. per cent CO_2, smoke density, liquid level, speed, frequency, load, voltage and so on. And though a single-point recorder is shown, the additional units required on multiple-point recorders and on recording controllers are concisely described. The back cover illustrates samples of various types of chart records. By asking for "Die-Out ND (1)", any mechanical executive can obtain one of these unique demonstrators.

Thwing-Albert Bulletin M-361A. This 4-page bulletin describing Thwing-Albert Portable pH Meters is being issued by the Thwing-Albert Instrument Company, 3339 Lancaster Ave., Philadelphia, Pa. The bulletin contains a short and easily understandable treatise on pH and how it is measured. The bulletin describes two models of meters. Model 1 is a simple potentiometric circuit with quinhydrone or antimony electrodes or both. Model 2 is a vacuum tube type with quinhydrone, antimony or glass electrodes and operates equally well on all three. Model 1 can easily be converted to a Model 2 at any time. Both models are direct reading in pH and are especially designed to take the mystery out of pH measurement. Any non-technical person can learn to use these instruments successfully in a very short time. The Thwing-Albert Portable pH Meters are especially adapted to potentiometric titrations. Among other useful applications of potentiometric titration is the making up of solutions to a definite pH. The operation of this instrument is said to be entirely independent of color, turbidity or suspended matter in solutions. Copy of Bulletin M-361A free upon request.

Tag Laboratory Thermometer and Hydrometer Catalog No. 1100 A. The C. J. Tagliabue Mfg. Co., Park & Nostrand Aves., Brooklyn, N. Y., announces the publication of a new Tag Laboratory Thermometer and Hydrometer catalog, No. 1100A.

In addition to the regular line of extreme precision and standard grade Tag Thermometers and Hydrometers, this valuable, new catalog now includes complete listings of the widely used A.S.T.M. thermometers with illustrations, also the well known Tag-A.P.I. and Tag certified hydrometers.

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grade conversion tables are retained and amplified.

A copy of catalog No. 1100A will be sent free upon request.

Alemite Controlled Lubrication. The Alemite Division of Stewart-Warner Corporation, Chicago, Ill., has just published its 1937 industrial catalog—"Alemite Controlled Lubrication." The introduction calls it the "Show Book of the Alemite Systems", and in 56 pages is presented the entire range of Alemite's industrial equipment—hand guns, power-operated units, fittings, hose, valve meters, and so on, including a complete section of hand gun repair parts, simplifying the ordering of parts for standard Alemite equipment.

The book is printed in two colors, and is profusely illustrated with photographs, drawings and diagrams. An interesting feature is the great number of photographs of Alemite equipment in actual use in many different types of industries—photographs taken on an extensive trip sponsored last year by Alemite to secure a collection of such photographs with data on how modern systematic lubrication is cutting maintenance costs in industry.

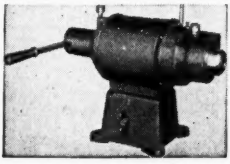
For a free copy of "Alemite Controlled Lubrication," send your request to Stewart-Warner Corporation, 1826 Diversey Parkway, Chicago, Illinois.

Rolock Wire Mesh Baskets. A 24-page booklet describing and illustrating Rolock wire baskets is now being issued by Rolock, Incorporated, 40 Station St., Southport, Conn. Rolock is said to offer light, sturdy and unbreakable wire mesh baskets, screens and crates for material handling and processing. For acid dipping the baskets are designed to drain quickly and completely, thus saving labor, time, and acid. Fumes radiate through the mesh and in hand work do not follow up the handle to the arm of the operator. On pages 6 to 23 several popular styles and a few special baskets are shown. All of these can be varied as to size and weight of mesh, location and type of bracing, number and shape of handles and so on. Rolock's experience in designing and constructing baskkets will be of particular help to the prospective purchaser. A copy of Rolock Wire Mesh Baskets free upon request.

Lewis Shepard Folder No. 321. An illustrated folder designated as No. 321 has just been issued by Lewis Shepard Company, 175 Walnut St., Watertown, Mass., in which this company's materials handling equipment is described. Copies of this folder which illustrates lift trucks, lift truck platforms, portable elevators, and so on will be sent free upon request.

H-V W-M Centrifugal Dryer Bulletin CD-101. The Mercil Type Centrifugal Dryer is illustrated and described in a 4-page bulletin which has been issued by the Hanson-Van Winkle-Munning Co., Matawan, N. J. Copy free upon request.

IDEAL SPEED LATHES



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